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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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Ref: 8ENF-RC

June 8, 2007

Mark Hall, Manager  
Hazardous Waste Section  
Waste & Underground Tank Management Bureau  
Montana Department of Environmental Quality  
P.O. Box 200901  
Helena, Montana 59620-0901

Re: Blast Furnace Flue and Monier Flue Cleaning,  
Demolition, and Soil Sampling Work Plan, May 5, 2007

Dear Mark:

Enclosed please find a copy of the above referenced work plan for the ASARCO East Helena Smelter blast furnace flue and monier flue cleaning, demolition, and soil sampling and the associated transmittal letter. Please contact me at (303) 312-6503, if you have questions on this or any related matter.

Sincerely,

Linda Jacobson  
RCRA Enforcement

Enclosure

cc: Charles Figur, EPA-L  
w/o Enclosure



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May 30, 2007

Linda Jacobson        (3 Copies)  
RCRA Project Manager  
US EPA Region VIII  
8ENF-T  
1595 Wynkoop Street  
Denver, Colorado    80202-1129

SENT BY CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

RE:    2007 Interim Measures Work Plan Addendum - Blast Furnace Flue and Monier Flue  
       Cleaning, Demolition, and Soil Sampling Work Plan - Asarco East Helena Plant

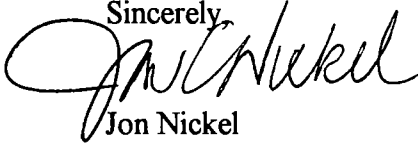
Dear Ms. Jacobson,

I am enclosing the 2007 Interim Measures Work Plan Addendum, Blast Furnace Flue and Monier Flue Cleaning, Demolition, and Soil Sampling Work Plan, along with the certification signed by an officer of ASARCO LLC, under the East Helena Consent Decree. A copy of the 2007 Interim Measures Work Plan Addendum is simultaneously being submitted in the enclosed compact diskette.

On March 29, 2007, EPA requested that Asarco prepare a separate Interim Measures Work Plan for the blast furnace flue and Monier Flue. EPA required that Asarco submit the Work Plan no later than June 4, 2007. The elements of the work plan were required to include 1) removal of structures and flue dust, 2) collection of pre-demolition samples, 3) characterization of soils, 4) proposal of soil criteria for contaminant excavation depth and confirmatory sampling, 5) spill prevention and containment measures for the demolition of the flue, 6) and any special handling or waste management procedures required for the flue dust. Although the 2007 Cleaning and Demolition Project (submitted to the Montana Department of Environmental Quality on May 18, 2007) references the cleaning and demolition of the blast furnace flue and Monier flue, this Work Plan will govern all future actions within these two areas.

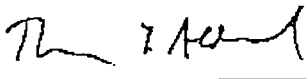
Pursuant to EPA's request, Asarco has prepared the attached 2007 Interim Measures Work Plan Addendum for cleaning, demolition, and soil sampling for the blast furnace flue and Monier flue. This Work Plan directly addresses issues that EPA required relative to the cleaning and demolition procedures, asbestos abatement procedures, dust control, and final cleaning (including soil sampling procedures), and a strategy for removal of flue dust residuals and associated impacted soils.

We look forward to EPA's approval of the work plan. Please contact me if you have any questions concerning the work plan.

Sincerely,  
  
Jon Nickel

CERTIFICATION  
PURSUANT TO U.S. v ASARCO INCORPORATED  
(CV-98-3-H-CCL, USDC, D. Montana)

I certify under penalty of law that this document, 2007 Interim Measures Work Plan Addendum, Blast Furnace Flue and Monier Flue Cleaning, Demolition, and Soil Sampling Work Plan, Asarco East Helena Smelter, was prepared under my direct supervision in accordance with a system designed to assure that qualified personnel gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Signature   
Name: Thomas L. Aldrich  
Title: Vice President Environmental Affairs  
Date: May 22, 2007



**Asarco East Helena Smelter  
2007 Interim Measures  
Work Plan Addendum**

**Blast Furnace Flue and Mornier Flue  
Cleaning, Demolition and  
Soil Sampling Work Plan**

**Prepared by:  
ASARCO LLC**

**May 2007**

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**ASARCO EAST HELENA SMELTER  
2007 INTERIM MEASURES WORK PLAN ADDENDUM**

**BLAST FURNACE FLUE AND MONIER FLUE  
CLEANING, DEMOLITION, AND SOIL SAMPLING,  
WORK PLAN**

**Prepared by:**

ASARCO LLC  
100 Smelter Avenue  
East Helena, Montana 59635

May 5, 2007

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# **ASARCO EAST HELENA SMELTER 2007 INTERIM MEASURES WORK PLAN ADDENDUM**

## **BLAST FURNACE FLUE AND MONIER FLUE CLEANING, DEMOLITION, AND SOIL SAMPLING, WORK PLAN**

### **1.0 INTRODUCTION**

On May 5, 1998, ASARCO LLC (Asarco) and the United States Environmental Protection Agency (EPA) entered into a Consent Decree (RCRA Consent Decree, U.S. District Court, 1998) to initiate the corrective action process in accordance with the Resource Conservation and Recovery Act (RCRA) and the Clean Water Act (CWA). As part of the RCRA Consent Decree, Asarco prepared several site investigation documents including:

- RCRA Current Conditions/Release Assessment (CC/RA) (Hydrometrics 1999a).
- Interim Measures Work Plan, East Helena Facility (Hydrometrics, 1999b).
- RCRA Facility Investigation (RFI) Work Plan (Hydrometrics, 2000a)
- Phase I RCRA Facility Investigation Report (Asarco Consulting Inc. (ACI) 2003, revised 2005).

A complete listing of RCRA Consent Decree documents is contained in the Phase I RCRA Facility Investigation (RFI) report.

As part of the RCRA Consent Decree, several interim measures were implemented for groundwater between 1999 and 2001. These earlier interim measures (IM) performed as part of the RCRA Consent Decree are discussed in Section 1.3 of the Phase I RFI report.

In May 2002, a RCRA Interim Measures Work Plan Addendum (IMWPA) was prepared (Hydrometrics, 2002). The 2002 IMWPA addressed groundwater impact concerns in the intermediate aquifer within the City of East Helena and down-gradient residential groundwater supplies north of the Asarco Plant site. These interim measures are discussed in Section 1.2.1.3 of the IMWPA.

During April 25-26, 2006, Asarco, EPA, and the Montana Department of Environmental Quality (MDEQ), met at EPA offices in Denver in a working session to evaluate existing site conditions and outline a strategy for groundwater remedial measures at the site. MDEQ's participation addressed the need for coordination of plant facility cleanup activities associated with a Montana Consent Decree (CDV-2004-212).

**1.1 PROPOSED INTERIM CORRECTIVE MEASURES FOR GROUNDWATER**  
EPA has expressed its preference for passive corrective measures for control of groundwater at the East Helena site. These measures could include in situ containment such as slurry walls and capping, or in situ treatment options such as soil fixation or permeable barrier walls. As a result of discussions between EPA, Asarco and MDEQ, groundwater corrective actions will focus on three general areas:

1. The former acid plant sediment drying area,
2. The speiss/dross area, and
3. The elevated groundwater arsenic plume down-gradient from these areas.

As a result of the April 2006 meeting between Asarco, EPA and MDEQ, and the follow-up of several action items as a result of the meetings (including preparation of cost estimates by engineers and contractors), the general strategy for groundwater corrective actions at the East Helena Facility is as follows:

- Slurry wall construction and temporary capping of the former acid plant sediment drying area. This project was completed in the Fall 2007. The trace of this slurry wall is shown on Figure 1-1.



- Slurry wall construction and capping of the speiss/dross area.
- Construction of a PRB near the area of the present PRB test wall.

The Groundwater Corrective Action Plan - 2006 (Asarco, August 2006) presented the conceptual design for implementation of these actions.

### **1.1.1 2006 Groundwater Remedial Actions**

In 2006, groundwater remedial actions were focused on construction of a slurry wall and placement of a temporary cover in the former acid plant sediment drying area. As part of implementation of this project, several work plans have been prepared that address construction of a slurry wall and temporary cover in the former acid plant area including:

- 2006 Phase 1, Phase 2 and Phase 3, Final Cleaning, Soil Sampling Backfilling and Interim Cap Work Plan (Asarco, 2006b). (This document addresses the temporary cover design that was placed in the former acid plant sediment drying area),
- Design Basis Memorandum, Asarco Former Acid Plant Sediment Drying Area Slurry Wall, East Helena, Montana (Shaw E&I 2006a),
- Work Plan, Former Acid Plant Sediment Drying Area Slurry Wall, October 4, 2006 (Shaw E&I 2006b),
- Construction Quality Control Plan, Former Acid Plant Sediment Drying Area Slurry Wall (Shaw E&I 2006c),
- Site Specific Health and Safety Plan for Slurry Wall Construction at the Former Sediment Drying Area (Shaw E&I 2006d),
- Permeability Testing for Slurry Cutoff Wall Memorandum, (Shaw E&I 2006e) and,
- Permeability Testing for Slurry Wall Cutoff Wall, Asarco East Helena, Montana, October 9, 2006, GeoSolutions Inc., 2006.
- Addendum To Interim Measures Work Plan, East Helena Facility, Former Acid Plant Sediment Drying Area Slurry Wall, Monitoring, Operation, and Maintenance Work Plan, (Asarco, 2007a).

The design for the slurry wall around the former acid plant sediment drying area included the following features:

- The wall is 800 feet long, 33 feet deep and 3 feet wide.
- The wall was keyed a minimum of 2 feet into the underlying low permeability ash unit.
- The wall was constructed using the same excavation equipment used for the test PRB.
- Standard bentonite grout was used for slurry wall construction.

The slurry wall around the former acid plant sediment drying area was constructed during late fall, October and November, 2006. A Construction Completion Report documents construction and results of quality control testing (Shaw E&I, 2007). A Soil-Bentonite Permeability and Compatibility Testing Report documents the performance of the bentonite slurry used for construction of the slurry wall (Geo-Solutions Inc., 2007).

#### **1.1.2 2007 Groundwater Remedial Actions**

In 2007, groundwater remedial actions will focus on construction of a slurry wall and placement of a temporary cover around the former speiss/dross area. A Design Plan for the Former Speiss-Dross Plant Area Slurry wall was prepared to address design and construction of a slurry wall and temporary cover (Shaw E&I, 2007a). The design for the former speiss dross area slurry wall includes the following features:

- The wall will be approximately 1,350 feet long, 35 to 42 feet deep and 3 feet thick.
- The wall will be keyed a minimum of 2 feet into the underlying low permeability ash unit.
- The wall will be constructed using the same type of equipment used for construction of the former acid plant area slurry wall.
- Standard bentonite grout will be used for slurry wall construction.

The trace of the proposed 2007 speiss/dross area slurry wall is shown in Figure 1-1. In order to provide working access for slurry wall construction equipment, most of the speiss/dross buildings were demolished in 2006. However, several structures remain and will be demolished to provide the working room access needed to construct the slurry wall. Figure 1-1 shows these structures including:

- The highline railroad trestle
- The speiss/dross plant baghouse and 200 foot stack
- The blast furnace,
- The immediately adjacent portion of the blast furnace flue
- The main natural gas valve house
- Garage

As described in Section 1.0 above, the 2007 remedial actions including demolition need to be sequenced and coordinated with other activities associated with the 2007 Cleaning and Demolition Project. Section 1.2 describes the 2007 Cleaning and Demolition Project.

## **1.2 MONTANA CONSENT DECREE CLEANING AND DEMOLITION PROGRAM**

Asarco and the Department entered into a 2005 Consent Decree (2005 Decree), on February 15, 2005, to resolve alleged violations of the Montana Hazardous Waste Act (MHWa) and Administrative Rules of Montana (ARM). The 2005 Decree required Asarco to develop and implement yearly Work Plans designed to remove, store, and properly dispose or recycle all remaining hazardous waste and recyclable materials from identified process units located within Asarco's East Helena Plant. The 2005 Decree expired on December 31, 2006. The department acknowledges that Asarco accomplished all of the activities contained in the 2005 Decree Work Plans, except for removing and properly disposing hazardous waste being stored in Subpart DD containment structures, cleaning the thawhouse building, and cleaning of certain portions of the acid plant contact section.

Asarco and the Department are preparing a new 2007 Administrative Order on Consent (2007 Consent Order), which will allow Asarco to continue with the cleanup processes established under the work plan provisions of the 2005 Decree. The 2007 Consent Order requires Asarco to develop and implement a yearly work plan for calendar years 2007-2012 to remove, store, and properly dispose or recycle all remaining hazardous waste and/or secondary material located in the process units, pollution control devices, and storage units and other identified areas of the facility.

### **1.2.1 Cleaning and Demolition Program Completed in 2006**

Under the Montana Decree, Asarco prioritized the cleaning and demolition of the process units located in the sinter plant during calendar year 2006. The scope of this cleaning and demolition project was referred to as Phase I. In February and March 2006, Asarco submitted a draft and revised 2006 Work Plan for this project. The Department approved the Work Plan on March 17, 2006.

On July 14, 2006, Asarco submitted a revised 2006 Work Plan. This Work Plan expanded the cleaning and demolition of the process units within the East Helena Plant to include Phase I, II and III sites (See Figure 1.1). The submittal described the cleaning and demolition of the following areas.

- ▶ PHASE I - Sinter plant conveyor gallery, sinter building, sinter crushing circuit, sinter returns tower, agglomerator building, coke hopper, sinter hopper, and ventilation ducting.
- ▶ PHASE II - Laboratory, dross building, bullion casting, speiss granulating pit, speiss loadout, blast furnace flue (from the dross building to the No.1 blast furnace), and north end of blast furnace building.
- ▶ PHASE III - Sinter plant baghouse, hot Cottrell, acid plant scrubbers, and mist precipitator building.

The cleaning and demolition activities outlined in the 2006 Work Plan were completed before December 31, 2006.

### **1.2.2 2007 Cleaning and Demolition Work Plan**

In May 2007, Asarco submitted the 2007 Cleaning and Demolition Project to the Department. The 2007 Cleaning and Demolition Project describes the management activities scheduled for this calendar year. Asarco selected URS/Cleveland Wrecking Company (URS/CWC) to conduct the 2007 Cleaning and Demolition Project. URS/CWC will be responsible for construction of a Corrective Action Management Unit (CAMU) Phase 2 Cell, which is being conducted pursuant to the 1998 RCRA Consent Decree. For the purposes of the 2007 Cleaning and Demolition Work Plan, the environmental cleaning, demolition, and handling procedures are primarily highlighted. URS/CWC will employ a systematic approach for cleaning, demolition, hauling, and disposition of the removed materials from identified process locations. The specific work practices associated with these activities are fully described within the Work Plan.

Asarco has prioritized the structures identified as Phase IV (Stage 1 and Stage 2), Alternate A, and Alternate B for cleaning and demolition during calendar year 2007. The Phase IV, Stage 1 work areas contain structures that must be cleaned and demolished in order to facilitate construction of a slurry wall in the former Speiss-Dross Plant Area. The thawhouse has been included in the Phase IV, Stage 1 cleaning and demolition work area, as further described in the following table.

#### **Phase IV, Stage 1**

- |                                 |                                |
|---------------------------------|--------------------------------|
| ○ Contractor's Lunchroom        | ○ Contractor's Change Room     |
| ○ Highline Railroad             | ○ Main Office                  |
| ○ Garage                        | ○ Main Natural Gas Valve House |
| ○ Baghouse & 200' Stack         | ○ Charge Building              |
| ○ Blast Furnace Bldg. Remainder | ○ Thawhouse                    |

The Phase IV, Stage 2 work areas contain structures primarily associated with the blast furnace gas cleaning operation and acid plant contact section, as further described in the following table.

#### **Phase IV, Stage 2**

- |                      |                                        |
|----------------------|----------------------------------------|
| ○ Blast Furnace Flue | ○ Truck Loading & Spray Dryer Building |
|----------------------|----------------------------------------|

- |                             |                            |
|-----------------------------|----------------------------|
| ○ Acid Plant Cooling Towers | ○ Sand Filters             |
| ○ 400' D&L Stack            | ○ 200' Acid Stack          |
| ○ Acid Plant                | ○ Monier Flue              |
| ○ Blast Furnace Baghouse    | ○ 425' Blast Furnace Stack |
| ○ Ore Unloading Bins        | ○ Sample Mill              |
| ○ Crushing Mill             | ○ Auto Shop                |
| ○ Pump Tank Building        | ○ Main Blower Building     |
| ○ Acid Plant Shop           | ○ Ringling Dust Building   |

The Alternate A and Alternate B work areas contain structures that are not directly associated with process or production areas, as further described in the following table. The areas described in Alternate A and Alternate B comprise primarily storage facilities and maintenance buildings that would not have contained process materials.

#### **Alternate A and Alternate B**

- |                                |                                      |
|--------------------------------|--------------------------------------|
| ○ Highline Railroad Remainder  | ○ Locomotive Crane Shed              |
| ○ Blast Furnace Office         | ○ Blast Furnace Lunchroom            |
| ○ Power House                  | ○ Pump House                         |
| ○ Blast Furnace Heat Exchanger | ○ Blacksmith Shop                    |
| ○ Machine Shop                 | ○ Carpenter Shop                     |
| ○ Direct Smelt Building        | ○ Abandoned Breaking Floor           |
| ○ Breaking Floor               | ○ Sinter Stockpile Building          |
| ○ Masons Shop                  | ○ High Lead Welding Shop             |
| ○ Motor & Paint Shop           | ○ Oil HS                             |
| ○ Paint Storage Building       | ○ Refractory Storage                 |
| ○ Meeting Room                 | ○ Zinc Plant O <sub>2</sub> Building |

Asarco had projected the cleaning and demolition of the locations set forth in Alternate A and B within the 2007 Cleaning and Demolition Project. However, delays in beginning construction of the CAMU Phase 2 cell are expected to suspend some or all portions of the Alternate A and B cleaning and demolition. Consequently, Alternate A and Alternate B areas will be completed by URS/CWC only after authorization of Asarco.

### **1.3 2007 BLAST FURNACE FLUE AND MONIER FLUE CLEANING, DEMOLITION AND SOIL SAMPLING WORK PLAN - SCOPE AND OBJECTIVES**

As described in Section 1.2.2 above, the 2007 Cleaning and Demolition Project addresses the management of materials in accordance with a pending Montana Administrative Order on Consent.

However, on March 29, 2007, EPA requested that Asarco prepare a separate interim measures (IM) work plan for the blast furnace flue and Monier Flue. EPA has stated that the IM work plan elements must include 1) removal of structures and flue dust, 2) collection of pre-demolition samples, 3) characterization of soils, 4) proposal of soil criteria for contaminant excavation depth and confirmatory sampling, 5) spill prevention and containment measures for the demolition of the flue, 6) and any special handling or waste management procedures required for the flue dust.

This 2007 Interim Work Plan Addendum for the cleaning, demolition and soil sampling program for the blast furnace flue and Monier flue has been prepared in response to EPA's request. The objectives of this 2007 IM Work Plan Addendum for the cleaning, demolition and soil sampling for the blast furnace flue and Monier Flue are:

- Describe the blast furnace flue and Monier flue dust cleaning activities conducted following the indefinite suspension of the East Helena Plant,
- Describe cleaning and demolition activities on the blast furnace flue that were conducted in 2005,
- Describe the additional pre-demolition cleaning activities to be conducted in 2007,
- Discuss existing soil data obtained from sample sites adjacent to the blast furnace flue and Monier flue,
- Outline general demolition procedures including flue structure and associated building demolition,
- Describe the final cleaning actions designed to attain the objectives of the Montana Administrative Order on Consent,

- Outline the soil sampling and excavation protocols and procedures for removal of flue dust and associated impacted soils in unpaved portions (if found) of the blast furnace flue and Monier flue floor,
- Outline the areas in which backfilling using fumed slag will be required to achieve proper site stabilization and drainage,
- Present the locations that will require interim capping,
- Provide the interim capping techniques, procedures, and materials that will be used to inhibit infiltration of precipitation within the blast furnace flue and Monier flue demolition areas, and
- Outline the operation and maintenance for the interim cap.



## **2.0 BLAST FURNACE AND BLAST FURNACE FLUE CLEANING AND DEMOLITION, 2005**

### **2.1 BLAST FURNACE FLUE AND MONIER FLUE DUST CLEANING AFTER INDEFINITE SUSPENSION OF PLANT OPERATIONS**

During normal operations, Asarco employed a standard practice of removing dust from the blast furnace flue and Monier flue. Depending upon the metal concentration, the dust was recycled or transported to an off-site treatment, storage, and disposal facility. In April 2001, Asarco indefinitely suspended the operations at the East Helena facility. Shortly thereafter, Asarco commenced a systematic approach to remove the dust from the blast furnace flue and Monier flue. The entry doors were removed to allow front-end loaders small access to the interior of the flues where the majority of the dust was collected from the floors. Hand tools (shovels and brooms) were used to clear dust from inaccessible areas. Street sweepers and high velocity vacuum systems augmented the cleaning process. This dust cleaning process was conducted throughout the length of the blast furnace flue and Monier flue, with the exception of overhang areas where the flues crossed road or access ways on the plant. Overhang areas could not be cleaned because of access difficulties, confined space concerns, and safety considerations. The small amount of dust that remains along the few overhang areas will be managed as part of the flue demolition process (see Section 3.1 and 3.3 below). To place the level of cleaning effort into perspective, over 15,000 tons of dust and related-material was removed from the blast furnace flue and Monier flue in calendar year 2001, which was transported to an off-site treatment, storage, and disposal facility.

### **2.2 CLEANING AND DEMOLITION OF THE NUMBER 1 BLAST FURNACE VENTILATION FLUE**

In December 2005, a portion of the blast furnace ventilation flue was demolished (see Figure 1-1). The plant cleanup associated with the cleaning and demolition included approximately 60 tons of brick, concrete and debris, which was removed to grade level and transported to the concentrate storage and handling building for temporary storage. In January 2006, the plant cleanup associated with the cleaning and demolition was

transported to an off-site treatment, storage, and disposal facility. Plywood bulkheads that were sealed with spray foam insulation were installed at both ends of the remaining blast furnace ventilation flue. In fall of 2006, the remaining portion of the blast furnace flue between the blast furnace and the dross plant was removed as part of the dross plant demolition conducted in 2006. The cleanup materials and debris were transported to the concentrate storage and handling building.

### **3.0 2007 BLAST FURNACE FLUE AND MONIER FLUE CLEANING AND DEMOLITION WORK**

The dust cleaning process employed by Asarco during calendar year 2001 was successful in removing the majority of blast furnace flue and Monier flue dust. Minimal amounts of dust remain within the flues, which are primarily confined to inaccessible, overhang areas. The following sections describe remaining cleaning techniques, dust control activities, available and relevant soil data, demolition procedures, post demolition sampling and testing, and post demolition dust and soil removal protocols that will be applied to the blast furnace flue and Monier flue.

#### **3.1 PRE-DEMOLITION CLEANING ACTIVITIES**

Pre-Demolition cleaning activities include the following general steps (URS April 2007):

- Work area preparation
- Initial dry removal of bulk solids
- Moistening of structure interiors for dust control.

Work area preparation consists of delineating a work area that can be both easily contained and is considered a cohesive unit with like contamination. The blast furnace flue and Monier flue has been defined as a delineated work area. Initially, the contractor will remove any remaining accessible bulk solids that remain within the flues. The goal of this task will be to remove any remaining aggregate, dry accumulation of lead, lead dust, lead debris or other associated residues at all accessible areas. This will be accomplished using hand tools and a trailer mounted "Hurricane" vacuum system with HEPA filtration. The removed material will be loaded via air-tight chute into appropriate containers (i.e. double 6-mil mega bags, etc.) and temporarily placed in the concentrate storage and handling building or hauled directly to CAMU. This initial removal of solids at ground level will ensure a more effective and more controlled method of demolition and dust control.

Following this removal process, the structure's interior will be pre-wet and moistened. The purpose of this action is to limit the potential for airborne dust during the above grade demolition operation. Pre-wetting operations will be accomplished using water trucks (for a portable water source), hoses, and misting systems. The application of wetting agents will be carefully controlled to avoid accumulation and limit infiltration of water through the floor of the flues. Although it is believed the floors of the floor are concrete slabs or masonry, the condition of the concrete or masonry is unknown, and there may be portions of the flue floor that are not paved or covered. As a result, careful water application is necessary to limit the potential for infiltration through the flue floor.

### **3.2 EXISTING SOIL DATA NEAR THE BLAST FURNACE AND MONIER FLUES.**

Figure 3-1 shows arsenic profile data across the plant site. Using arsenic concentrations as an indicator, arsenic and metals are generally elevated in surface and nears surface soils through out the plant area. Arsenic and metals generally decrease with depth.

Arsenic concentration profile data also show generally higher arsenic concentrations near the south end of the plant, in or near areas where acid plant sediments were generally handled, and adjacent to the former Upper Ore Storage Area. Arsenic concentration profiles data also show elevated arsenic concentrations adjacent to the southern portion of the blast furnace flue.

Arsenic and metals data from surface and subsurface soil samples collected from monitoring wells and surface soil sample sites adjacent to or near the blast furnace flue and Monier flue are contained in Appendix A and are summarized on Table 3-1. Sample site locations are shown on Figure 1-1 and on Figure 3-1. In general, surface soil sample results (UPS-SS1, UPS-SS2, UOS-SS3 and UOS-SS5) and monitoring well soil sample results (DH-30, DH-46, DH-45, and DH-39) show elevated metals in near surface soils (0 to 6 feet) but generally decrease with depth below the six-foot interval. Monitoring wells DH-30, DH-46 and DH-45 are drilled directly adjacent to the blast furnace flue (see Figure 1-1) and are probably the most representative of soil near this area.

Table 3-2 presents site wide surface soil statistics for the plant site (2003 Phase 1 RFI (ACI, 2003)). In general, soils adjacent to the flue are often above the site wide average but less than maximum recorded values for the site. An exception is UOS-SS1-3 for the 1 to 2 foot increment, which had a site wide high for copper.

Table 3-3 presents summary statistics for surface soils in the upper ore storage area (2003 Phase 1 RFI (ACI, 2003)). A comparison of the summary statistics with Table 3-1 shows that soil adjacent to the blast furnace flue at site UOS-SS3 (see Figure 1-1) had maximum concentrations for all of the metals tested in the 4" to 12" interval and had maximum concentration values for some of the metals in other tested increments as well. All results for this location were higher than the averages for soil sample sites in the Upper Ore Storage Area sites. A review of sample site UOS-SS5 also indicates elevated metal concentrations (see Table 3-1), but are more typically near the mean concentrations for Upper Ore Storage Area sites (see Table 3-1). As noted above, the monitoring wells DH-45 and DH-46 are located directly adjacent to the southern portion of the blast furnace flue (see Figure 1-1) and may be more representative of soils near the flue. Although surface soils and shallow subsurface soils (1 to 6 feet) are elevated at these locations, with few exceptions soil concentrations are near or below average concentrations from corresponding sample intervals in the Upper Ore Storage Area sites (see Table 3-1 and Table 3-3). The unusually high metal concentrations associated with sample site UOS-SS3 may be a reflection of its locations near a blast furnace flue traffic underpass, which would have been a major traffic route from the Upper Ore Storage Area to the interior of the plant.

Table 3-4 presents summary statistics for unpaved on-plant site soils. A comparison of the summary statistics with Table 3-1 shows that near flue soil site UP-SS01, which is located adjacent to the Monier flue (see Figure 1-1), had the highest measured concentrations for cadmium and lead, compared to other unpaved area sample sites. This probably reflects historic spillage near the clean out door area. The other Monier flue area sample, UP-SS02 (see Figure 1-1) had relatively low soil concentrations (see Table

3-1) that were below the average and median values for unpaved on-plant sample sites (see Table 3-4). The nearest monitoring well in the Monier flue area is DH-39 (see Figure 1-1). A comparison of soil sample results from DH-39 (see Table 3-1) against the summary statistics for on-plant unpaved soil sites (Table 3-4) shows copper and zinc concentrations above the mean concentrations for the 1-2 and 2-4 foot increments. However, the concentrations of the remaining metals analyzed (arsenic, cadmium and lead) were lower than the average for these sites.

### **3.3 GENERAL DEMOLITION PROCEDURES**

The general cleaning and demolition procedures for the 2007 Cleaning and Demolition Project are described in the 2007 Cleaning and Demolition Project and CAMU Phase 2 Cell Project Work Plan (URS 2007). These procedures include cleaning and demolition of the remaining portions of the blast furnace flue and Monier flue. (see Figure 1-1). Prior to above grade structural demolition, site inspections will confirm:

- Pre-demolition decontamination and cleaning are complete
- Any required interior and exterior asbestos abatement operations are completed.

Pre-demolition decontamination and cleaning are described in Section 3.1 above.

Asbestos abatement methods are also included in the 2007 Cleaning and Demolition Work Plan (URS, 2007). Asbestos mastic is present on some of the blast furnace flue brick. The associate flues and structures will be subject to asbestos abatement activities prior to and during demolition as required. URS has hired an asbestos abatement contractor (IRS Environmental) to perform asbestos abatement activities. Their work procedures and methods are described in Attachment B of the 2007 Phase IV Work Plan and within Appendix B of this Work Plan.

Any friable and removable asbestos materials will be removed and handed prior to demolition in accordance with the asbestos plan in Appendix B. An exception to this is the asbestos mastic present on some of the blast furnace flue brick. There is no practical and safe way to remove the mastic prior to demolition. The mastic is non-friable and is

not considered a potential airborne hazard. In addition most of the mastic is covered in insulation foam, again with is not practical to remove prior to demolition. As a result, bricks with mastic will be handled using the same procedures as other concrete masonry structure demolition as described below in Section 3.3.2.

### **3.3.1 Steel Structure Demolition**

Although little or no steel demolition is expected for demolition of the blast furnace flue and the Monier flue, steel structure demolition may be required for portions of the flues that connect with other structures. The approach for steel demolition is described in the 2007 Cleaning and Demolition Work Plan and is described as follows:

The approach to building demolition is to use excavators (track-mounted) equipped with specialty attachments (such as shears, breakers and grapples) to structurally remove, bay by bay, the various structural members. The sequence approach is as follows:

- Each structure will be demolished using excavators with specialized attachments. Each truss frame structure between bays will be lowered and/or dropped to the ground by separating the portion of the tension members on the bottom cord to cause the truss to sag in between two bays.
- The excavator will then separate the remaining tension members of the truss to allow one end of the main truss to become separated from the supporting column.
- The other end (still connected) of the truss will be disconnected. The remaining roof traverse trusses, connecting main truss to main truss shall be removed to allow placement of the main truss behind the equipment for salvage. The remaining portion of the roof attached to the next bay section will be cut allowing for removal. The excavator will then drag the roof section behind for stockpiling and separation. This process is repeated for each of the numerous bays within each of the above referenced buildings.
- Steel columns will be cut with a shear at the base, and allowed to fall to the ground.

All material will be staged behind the working areas of the primary excavators, where they will be prepared by additional shears before they are loaded into dump trucks and hauled to the steel staging area just to the north of the Coverall Buildings. Materials will be continuously removed to allow other operations to proceed.

### **3.3.2 Concrete/Masonry Structure Demolition**

Concrete/masonry demolition will constitute the majority of demolition work for the blast furnace flue and Monier flue. This approach is outlined in the 2007 Cleaning and Demolition Work Plan. Although all of the approach may not specifically be applicable to flue demolition, this approach is also described below as follows:

A 100,000 lb excavator (or larger), equipped with a breaker, and a track loader will be utilized for the complete above grade concrete demolition operations of the various concrete and masonry structures. The exterior walls are constructed of either a concrete block material or a brick material. Starting at one end, URS/CWC will commence breaking from the top of the wall down from column to column. Once complete with the exterior wall at the end, URS/CWC will commence the removal of the concrete upper floors slabs within the same constraints as the wall. This process is limited to the first exterior column line. Demolition of any elevated floor slabs and walls will be completed in a top down approach for each individual column line. URS/CWC will break the closest interior columns under the roofs and floor, allowing the individual floor to sag. URS/CWC will work into the building, breaking the sagged slabs and allowing the debris to fall to the ground. As the floor slabs are removed and area is created in front of the equipment, URS/CWC will continue to break interior columns from the top down.

Once complete for that column, URS will repeat the same procedure for the remaining column lines. Utilizing a track loader, the broken concrete debris will



be removed and transported to the designated staging area for placement into the concentrate storage and handling building, or hauled directly to the CAMU, (dependent upon CAMU construction phasing).

### **3.3.3 Demolition Material Stockpiling**

Flue demolition debris (consisting of concrete and brick with the majority of flue dust removed) and associate debris from the blast furnace and Monier flue will be stockpiled in accordance with procedures outlined in the 2007 Demolition and Cleaning Work Plan, and further described as follows:

As steel structure and concrete demolition is progressing, material will be hauled and stockpiled in the designated Material Staging and Processing areas located within the demolition area footprints. At these locations, both general demolition debris and salvageable metal materials will be sized to meet the requirements of the final disposition location. Once general demolition debris has been segregated and sized, URS/CWC will load and transport the material to temporary storage in the concentrate storage and handling building or directly hauled into the CAMU. At the concentrate storage and handling building, the material will be dumped and consolidated as much as possible to maximize the interior storage space. With regards to salvageable metals, URS/CWC will size the material to its requirements and stage the material for eventual loading into railcars and/or trucks for transport to the recycling facility.

### **3.3.4 Debris Transportation**

Demolition debris will be transported using procedures outlined in the 2007 Cleaning and Demolition Work Plan and further described as follows:

URS/CWC understands the critical nature of loading and transporting of waste debris from either temporary storage or demolition areas to the CAMU. Therefore, URS/CWC will take a proactive approach to ensure that the transportation of waste debris does not generate dust or spread waste debris outside the limits of the loading area and the final CAMU placement area. For the currently stored waste debris in the Coverall Building and concentrate storage and

handling building, URS/CWC will place a sprinkler system atop the large debris fields that will slowly distribute and control water and allow for the moistening of the debris. Due to the large sections of debris in these buildings, this process will be allowed to continue until a point where URS/CWC feels the moistening will no longer be required to control dust. URS/CWC will monitor the sprinkler systems to ensure that dust suppressing water does not become a run-off problem. For all demolition debris, as further described below, URS/CWC will utilize water trucks and misting systems to keep debris moist during the demolition and loading process. These two operations will minimize airborne dust during the loading operation and be the first step in prevention during transportation.

URS/CWC anticipates utilizing 25-35 ton rock trucks and/or 10-wheel dump trucks, or a combination thereof, to haul the material to the CAMU. All trucks will be equipped with sealed tail gates that will be closed during times of hauling to ensure that debris is not released outside the limits of the loading and dumping areas. In order to further mitigate dust generation during hauling operations, URS will construct a truck moistening station at the exit of the ASARCO site over to the CAMU site. This station will consist of a scaffolding platform on which personnel will mist water on the loaded debris as a final step before it travels outside the property fence line and across the County road. The spray will add a final moisture barrier/binder to the debris for the short distance to the CAMU. Transport vehicles will be limited to a maximum 10 miles per hour while both on-site and during transport. Limiting speeds will prevent dust from become airborne during transport and will prevent the kick-up of dust due to rolling tire action.

At the CAMU dump area, a water truck will be placed to lightly mist debris and knock down any dust during the dumping and spreading phase of the debris in the CAMU. Use of water will be kept at a minimum. At all times, however, the elimination of dust will be given top priority.

Transport of waste on-site will follow prescribed paths, which will be determined during the course of demolition. Due to the changing nature of the site as demolition of structures progress, haul routes will require modification as site conditions dictate. However, once defined, these haul routes will be enforced to create dedicated routes that can be maintained to mitigate dust and debris migration, and prevent any potential spread of contamination. Maintenance of haul routes will be conducted through routine daily inspection to ensure that debris is not being released. Additionally, haul routes will be lightly wet with a water truck on a frequent basis throughout any given day to prevent the generation of dust due to vehicular traffic. As needed, URS/CWC will utilize the services of a street sweeper to clean the haul routes of accumulated debris and dust. This debris and dust sweepings will be dumped on-site and handled as demolition debris for eventual placement into the CAMU.

### **3.3.5 Final Cleaning Actions**

Once demolition is complete and the debris has been removed, a final inspection of the floor foot print of the blast furnace flue and the Monier flue will be conducted. A visual survey will be conducted to catalog any area within the structure footprints where concrete is not present and underlying soils may have been exposed to flue dust or other high metal concentration materials. The survey will also document the condition of concrete within the structures and floors. The documentation will include a description and photographs. All exposed soil areas, broken or severely cracked concrete areas will be mapped and recorded on plan views of the demolished structures.

#### **3.3.5.1 Exposed Soil Area Sampling and Cleaning**

If exposed soil areas are encountered within the flue footprints, the exposed soil area will be field tested using a portable X-Ray Fluorescence (XRF) analyzer. Exposed soil areas will be field tested for concentrations of arsenic, copper, cadmium, lead and zinc. The sample and analytical program is summarized in Table 3-5.

Since flue dust metal concentrations generally range in the percent range (10,000 mg/l to 200,000 mg/l), XRF results in this concentration range will be indicative of remaining flue dust, or flue dust impacted soils. Where exposed soil areas within demolition structure footprints have been exposed to flue dust or other high metal concentration materials, limited excavation of flue dust residuals and impacted soils will be conducted. The criteria for excavation is as follows:

- Excavation of obvious flue dust or flue dust impacted soil based on visual observation. Flue dust is generally very fine grained and gray to black in color. This generally contrasts with native soils which can be fine to coarse grained, typically show traces of sand and gravel, and are generally a tan or brown color where they have not been impacted.
- Exposed soils or materials within the blast furnace and/or blast furnace flue footprint that exceed the Upper Ore Storage Area arithmetic mean for the 3-5 foot interval as shown on Table 3-3 and summarized in Table 3-5 will be excavated. Since soil concentrations are elevated through out the Upper Ore Storage Area, the arithmetic mean has been arbitrarily selected as a relatively conservative target for soil removal. Soils will be excavated until:
  - The values for arsenic, copper, cadmium, lead and zinc are below the arithmetic mean as shown in Table 3-3 and as summarized in Table 3-5, or
  - The practical excavation limit of excavation equipment is reached (depending on access, this is typically 12 to 15 feet) or
  - The water table is encountered. (Past experience has shown excavation into the water table without the addition of slurry clays or mechanical trench boxes is not practical).
- Exposed soils or materials within the Monier flue footprint that exceed the unpaved on-plant site area soils arithmetic mean for the 2-4 foot interval as shown on Table 3-4 and on summarized in Table 3-5 will be excavated. Since soil concentrations are elevated through out unpaved areas on the plant site, the arithmetic mean for unpaved plant site soils in the 2-4 foot interval has been arbitrarily selected as a relatively conservative target for soil removal. Soils will be excavated until:

- The values for arsenic, copper, cadmium, lead and zinc are below the arithmetic mean as shown in Table 3-4 and as summarized in Table 3-5, or
- The practical excavation limit of excavation equipment is reached (depending on access, this is typically 12 to 15 feet) or
- The water table is encountered.
- Following excavation, samples collected from the deepest interval sampled will be analyzed using the SPLP Method EPA 1311 to document metal concentrations in test leachate in the remaining soil.

The above exposed soil area cleanup criteria is summarized on Table 3-5.

Surface and subsurface soil samples will be collected from exposed soil areas using the same techniques and procedures used for Interim Measures (IM) and RCRA Facility Investigation (RFI) activities, as described in the IM and RFI Work Plans (Hydrometrics 1999 and Hydrometrics 2000). A total of 5 surface (0-4 inch increment) soil samples will be collected from identified exposed soil areas and composited into one representative sample of the area. Since the flue footprints are liner features (typically 10 to 15 feet wide by 100s of feet long), an exposed sample area is defined as an exposed soil area within the flue footprint of 100 feet long or less. Surface soil samples will be collected using hand tools (hand shovel, trowels, or hand augers). The samples will be stored in ziplock baggies and archived for future analysis (either XRF for total metals or SPLP), or analyzed on site using a field portable XRF. All analytical work will be conducted well before an assumed 6-month holding time limit for metals. Sites with visually obvious flue dust or that exceed the numerical criteria described above and in Table 3-5 will be considered candidates for subsurface soil excavation. The sampling Standard Operation Procedures (SOPs) and analytical parameters and methods are summarized in Table 3-5. For conveniences a table of relevant SOPs from the IM and RFI work plans are listed in Appendix C of this work plan.

Sub-surface samples will be collected directly from the soil excavation equipment bucket in the following increments until excavation depth criteria described above and

summarized in Table 3-5 are met. Sub-surface soil increments are 4-12", 1-2', 2-4', 4-6', 6-8', 8-10', 10-12, 12-15 feet, as necessary. One soil sample will be collected directly from the backhoe bucket for each increments within an identified exposed soil sample area. Excavation and sampling will continue using the procedure described above until numeric criteria are met, or practical excavation limits prohibit further excavation. Samples will be analyzed in the field using a portable XRF and stored in ziplock baggies and archived until the project is complete. Any future analytical work (primarily SPLP) will be conducted well before an assumed 6-month holding time limit for metals.

#### **3.3.5.2 Concrete Floor Area Sampling and Cleaning**

The final cleaning of concrete covered demolition footprint areas will involve a three-phased approach. First, the concrete footprint will undergo a rough cleaning using conventional scraping and shoveling methods to remove any solid residues that may have accumulated during the demolition process. Second, the concrete footprint will be mechanically swept. The use of a mechanical sweeper will remove surface materials that may not be completely removed using scraping and shoveling techniques. Finally, the concrete footprint will be cleaned using a high-velocity, truck mounted vacuum. This final cleaning method will remove any fine material, particularly along the interfaces between the concrete floor and building columns, fan foundations, and support walls.

#### **3.3.6 Capping of Demolished Areas**

The blast furnace flue and Monier flue areas where above grade demolition activities have been completed will be sealed in a manner that will mitigate the infiltration of water below the foot print area through existing or created cracks and crevices. Demolition foot print areas will be covered the 2007 as delineated on Figures 3-2 through 3-6 with 10-oz geotextile and a geomembrane cap of 20-mil RPE liner.

Upon completion of the demolition operations and area clean-up, URS/CWC will remove all debris and items from the slab that could possibly penetrate the subject geotextile and geomembrane. URS/CWC will utilize the existing on-site fumed slag as fill material over the remaining demolition slabs/areas. This fumed slag will be placed and rough

graded to create the positive drainage required per the Construction Document Drawings. The fumed slag has been used as a grading material at the plant site in the past and possesses good physical characteristics for fill or sub-foundation uses (granular material and compacts wells). Although fumed slag contains elevated total metal concentrations, the metals are bound in a silicate-iron matrix with characteristics of low metal leachability. The potential for metal migration from the fumed slag is low. In response to EPA's July 6, 2006 comments, Asarco provided the rationale for using fumed slag for backfilling purposes, including study results derived from the RCRA Consent Decree investigations. The slag-related investigative results contained in the Current Condition Release Assessment (CC/RA, January 1999) and qualitative analyses of fumed slag (May 2001) are attached as Appendix D. In April 2005, Montana Department of Environmental Quality representatives collected fumed slag samples from the East Helena Plant to assess the potential environmental impacts from its use as an iron substitute within the cement manufacturing industry. A copy of the April 2005 fumed slag sampling event results is attached as Appendix D. A July 2006 Department Environmental Impact Statement (EIS) may contain additional slag related information.

The geotextile and geomembrane will be laid, seamed, and secured as detailed. Additionally, sandbags will be placed intermittently within the center liner area to prevent the liner from being picked up by wind uplift or other forces. This will be done in sufficient quantity to ensure the liner stays in place. As an added preventative measure, URS/CWC will utilize sandbags made of UV Resistant 9-mil PE, which will provide superior UV resistance (compared to standard plastic woven sandbags) to prevent breakdown by sunlight.

URS/CWC will utilize the services of a subcontractor, Northwest Lining & Geotextile Products, Inc., for the installation of the temporary demolition caps. Complete details for the geotextile, geomembrane, and liner attachment to be utilized are in Attachment C of the 2007 Cleaning and Demolition Work Plan (URS, 2007) and are also in Appendix E of this Work Plan.

### **3.3.6.1 Interim Cap Techniques, Procedures and Materials**

The interim caps will be constructed to cover newly exposed footprints in the demolition areas. Depending on when the work is initiated, work sequencing and/or weather conditions, the interim cap installation may be conducted before final removal of flue dust and impacted subsurface soils in exposed areas (see 3.3.5.1 above). Scheduling is discussed further in Section 4.0.

The interim cap details and specifications are shown on Figure 3-6. In general, from the top down, the interim cap will consist of the following:

- Sand bags to hold down the interim cover during windy periods,
- A 24-mil reinforced polyethylene (RPE) with the PRE seams overlapped 3 inches and sealed with a butyl rubber seaming tape,
- A minimum 10 ounce non-woven geotextile,
- A prepared sub-grade consisting of fumed slag fill for grading purposes, and
- Existing soils, concrete slabs and/or concrete foundations.

### **3.3.6.2 Maintenance of Interim Cap**

#### **Site Inspection**

Periodic inspections of the interim cap will be conducted to ensure that the interim cap systems are performing adequately and to identify problems and provide proper maintenance of interim cap systems. The inspection program will involve three types of inspections: (1) informal inspections, (2) periodic technical inspections, and (3) special inspections after extreme events.

The informal inspection is actually a continuing effort by on-site personnel, performed in the course of their normal duties. Periodic technical inspections and inspections after extreme events will be performed by onsite Asarco staff (or other technical representatives) familiar with the design and construction of the cover systems. The periodic technical inspection will be performed monthly to document the condition of the cap components. Special



inspections are very similar to periodic technical inspections but are performed only after an extreme event such as a rare rainstorm, tornado, or earthquake.

The inspection of the cover systems will typically involve walking the entire site in a systematic fashion that ensures a comprehensive review. If any problem or deficiency is found, the inspector should record the location on a field sketch. A complete description of the affected area, including all pertinent data (i.e., size of the area and other descriptive remarks such as exposed synthetic materials) should be recorded on the appropriate reporting forms. An accurate and detailed description of observed conditions will enable a meaningful comparison of conditions observed at different times.

Photographs may be helpful in documenting problems. Provisions should be made to keep a photographic log of problems, repairs, and general site conditions. This log will provide valuable information when evaluating the performance of the cover system and when planning repair strategies.

It is important to have a record of site conditions at various stages after capping. Good documentation will provide valuable information to help maintenance and repair planning. Inspection checklists to assist in the inspection and documentation procedures should be developed and modified as needed throughout the interim capping period. The checklist will (at a minimum) contain items to evaluate such as membrane condition, sand bag condition, liner seams, liner/concrete attachments and site drainage. A copy of an example inspection form is attached in Appendix F.

### **Site Security**

The interim cap will be contained within the fenced Asarco facility and will be kept secured so that people or animals do not disturb the cap. Site access by ongoing plant or demolition operations will be limited through the use of barricades, barrier tape, or temporary fencing. Plant personnel will advise contractors conducting site activities of access limits within or near capped areas.

## Site Maintenance

As shown in Table 3-6, there are four different types of maintenance tasks listed by priority rather than by frequency. Table 3-6 is provided as a guide to prioritize the different types of maintenance activities in proper perspective. The different types of maintenance are also discussed in the following subsections.

1. Emergency maintenance - Emergencies are situations arising unexpectedly that require urgent attention. Often, immediate response must be provided to avert potential serious damage. Provisions for emergency repair/damage control activities must therefore be in-place prior to the occurrence. Toward this end, an Emergency Contacts list will be prepared and kept current, and include local emergency response organizations, assigned maintenance personnel, and agency and owner representatives. Table 3-7 provides a partial list of emergency contacts.
2. Preventative maintenance - Preventative maintenance will be performed to extend the life of equipment and structures. With the exception of routine surveillance and inspections, preventative maintenance tasks should be scheduled in accordance with the recommendations of the material and equipment manufacturers. Scheduled inspection and maintenance of all site facilities will help ensure that potential problems are discovered and corrected before they become serious, as well as providing for the performance of periodically required upkeep. During routine inspections, the Asarco personnel should be alert for any abnormal conditions, which could indicate potential problems.
3. Corrective maintenance - Corrective maintenance consists of repair and other non-routine maintenance. Asarco personnel must always be ready to handle these tasks as the need arises. Corrective maintenance procedures should follow the equipment or material manufacturer's recommendations. In planning for the corrective maintenance, arrange for the assistance of an engineer or manufacturer's representative, if necessary.

4. Housekeeping - Maintaining well-kept facilities indicates pride on the part of the Asarco personnel, and provides for good and efficient operations. Well-kept property cultivates good neighbor relations with adjacent property owners. Housekeeping tasks may include collecting/disposing of litter or debris and maintaining access barriers.

### **3.3.7 Storm Water Pollution Prevention Plan**

Storm water during demolition will be managed in accordance with the Storm Water Pollution Prevention Plan (SWPPP) outlined in the 2007 Cleaning and Demolition Work Plan (URS, 2007) and is described as follows:

URS understands and appreciates the importance of the SWPPP due to the present concerns and conditions of the ASARCO facility. URS will utilize Best Management Practices (BMPs) for various construction activities. From the existing SWPPP, applicable information, such as management practices for the hazardous material storage areas, will be incorporated into URS' Best Management Practices. Other material handling practices related specifically to the decontamination and demolition activities will be addressed. Management practices for cross-contamination control will be addressed, such as avoiding spills from construction vehicles during hauling, loading, servicing, and fueling and controlling contaminated soil erosion. Changes to the storm drainage system due to demolition will be addressed as the structures are demolished and the site conditions change.

Standard erosion control measures will also be utilized, including controlling dust, providing straw bales around storm drain inlets, placing sand-bags at critical perimeter locations, and avoiding off-site tracking of debris from vehicles. Provisions to avoid ponding and maintain excavations free of storm water runoff will be addressed. Typically, this will involve filling these locations prior to storms. Measures for erosion control will be added as the project progresses.

Inspection of the erosion control measures will be made prior to, during, and after storms to evaluate the adequacy of these measures and to manage corrections as

necessary. Documentation of the inspection and correction activities will be maintained, as required. Generally, the inspection and documentation will be done by the Project Manager / Engineer. Copies of the documentation will be forwarded to ASARCO for review and records.

### **3.3.8 Dust Control Plan**

Dust control will be performed in accordance with the dust control plan outlined in the 2007 Cleaning and Demolition Work Plan (URS, 2007) and is described as follows:

The general requirements of this plan are to provide adequate resources to control dust and to detail the means and methods that will be utilized to implement dust control measures during the cleaning and demolition in order to support scheduled activities/operations within the ASARCO facility. URS/CWC's dust control measures are designed to control the emission of visible fugitive nuisance dust. These controls will be accomplished through the use of administrative, engineering, and physical controls that will include, but not be limited to the following:

- Moistening surfaces with water
- Application of dust suppressants or encapsulates, where applicable
- Minimizing soil, road, and surface disturbances
- Minimize dusting exposure periods and wind erosion before dust-abatement measures are applied
- Curtailing of work activities during high wind conditions (over 15 MPH average hourly rate)
- Controlling vehicle/equipment speeds (10 MPH maximum)
- Restricting traffic to designated roads/corridors
- Equipment Selection

URS/CWC considers the mitigation of airborne dust generation to be a priority. Throughout the project, URS/CWC will take all necessary steps to effectively control dust in the working area during demolition operations. As previously mentioned, URS/CWC will remove at ground level and at all accessible areas all gross debris

accumulation that could be a source of airborne dust. Furthermore, URS/CWC will institute a program of pre-wetting and moistening building interiors and horizontal surfaces where dust has accumulated. This pre-wetting of the structure interiors will limit the ability of remaining dust to become airborne during the demolition process. As the structures are demolished, the dust will be allowed to fall to the ground where it can be gathered, containerized appropriately, and properly managed.

#### **3.3.8.1 Application with Water During Demolition**

The use of water will be the main source for dust control. URS/CWC will keep all work areas (including roads, access points) within the facility, wet during work activities. This will be accomplished by using existing 2,000-gallon water trucks. Each water truck will be equipped with spray-bars for wetting haul and access roads; water cannons and necessary hoses, valves, and fittings will be used to provide spray water for dust control where needed in remote areas where a water truck can not be utilized.

Furthermore, during the life of the project water truck(s) will be available during the actual demolition of the above grade steel and concrete structures. Localized fine water spray pointed at the source of demolition (and therefore dust source) reduces dust particles to become airborne. Additionally, URS will utilize a Dust Boss™ water misting system. The Dust Boss™ is a fully automatic, oscillating ducted fan with a high pressure misting system that creates a high performance dust barrier. Dust Boss™ uses a high pressure misting system to create an ultrafine mist that attracts dust and drives it to the ground. During structure demolition, this equipment will be pre-positioned in an area that will ensure the generated dust barrier is effective. To minimize water run-off, both the water truck and Dust Boss™ water supply will be used only if necessary.

#### **3.3.8.2 Dust Control During Loading and Debris Transportation**

During loading, unloading, and material transfer operations, URS/CWC will minimize material drop heights to reduce emission of fugitive dust. During loading of demolition debris, additional spray water will be utilized to control fugitive dust emissions from this

operation. After demolition debris is loaded into the truck beds, URS/CWC will then moisten the debris payload down prior to the vehicle leaving the loading areas.

As described above, during debris transportation, URS/CWC will construct a truck moistening station at the exit of the ASARCO site over to the CAMU site. This station will consist of a scaffolding platform on which personnel will mist water on the loaded debris as a final step before it travels outside the property fence line and across the County road. The spray will add a final moisture barrier/binder to the debris for the short distance to the CAMU. Transport vehicles will be limited to a maximum 10 miles per hour while both on-site and during transport. Limiting speeds will prevent dust from become airborne during transport and will prevent the kick-up of dust due to rolling tire action.

At the CAMU dump area, a water truck will be placed to lightly mist debris and knock down any dust during the dumping and spreading phase of the debris in the CAMU. Use of water will be kept at a minimum at all times, however, the elimination of dust will be given top priority.

#### **3.3.8.3 Dust Suppressant**

The primary dust control measure to be used will be water. However, the application of an accepted dust suppressant dispersed from the water truck or special equipment as a dust suppressant may be required during periods of time that the application of water alone is inadequate for dust control. Dust suppressant product information and MSDSs will be submitted for approval prior to the usage and/or application.

#### **3.3.8.4 Area Control**

URS/CWC will use specific loading areas for each decontamination/demolition removal location to minimize disturbances and control material transfer operations. During the demolition of each structure, URS/CWC will designate a staging and loading area directly adjacent to each structure. Often this area will be within the footprint of the structure being demolished. This staging and loading area, specific to each structure, will

be kept constant and will be maintained to control the migration of dust and debris from moving material unnecessarily.

#### **3.3.8.5 Water Source**

URC/CWC will utilize the existing ASARCO provided fill station, adjacent to Upper Lake, as the source of non-potable water to be utilized for dust suppression operations.

#### **3.3.8.6 Field Quality Control**

URC/CWC Project Staff (i.e. Project Superintendent, Foreman, H&SP) will inspect work areas daily to assess the need for implementation (or additional implementation) of dust control measures.

#### **3.3.8.7 Overall Dust Control Application**

URS/CWC will control fugitive dust emissions by using the following overall methods:

- Provide dust suppression (water) before, during, and after demolition of a structure, provided it is safe to do so.
- In cases where structures are to be dropped (stack demolition, elevated structures), URS/CWC will moisten the targeted drop area prior to the demolition of the structure.
- Provide dust control during material sizing and loading operations.
- Control material drop heights during loading, unloading and material transfer operations.
- Minimize and control material handling operations.
- On-site vehicular traffic control and haul road maintenance
- If necessary, URS/CWC will apply other approved methods for control of dust during specific procedures.

#### **4.0 SCHEDULE**

A preliminary schedule for the blast furnace flue and Monier flue project is in Figure 4-1. The schedule is preliminary and is dependent on the sequencing of several other cleaning and demolition projects that are addressed in the Cleaning and Demolition Plan (URS 2007). Key events include:

- Authorization to begin construction of the CAMU
- Construction of the CAMU
- Pre-demolition Cleaning
- Demolition of structures necessary for demolition
- Stack demolition.
- Flue demolition
- Flue dust removal and associated impacted soils from exposed soil areas
- Interim Cap

Since the Monier flue would provide a barrier for dust and debris during stack demolition, this flue will likely be retained until after the stacks have been brought down by demolition. It is possible portion of the blast furnace flues can be cleaned and demolished independently of the stack-oriented activities.

Depending on when the work is initiated, work sequencing and/or weather conditions, the interim cap installation may be conducted before final removal of flue dust and impacted subsurface soils in exposed areas. In this case, the final cleanup of flue dust and associated impacted soils within the foot print would be conducted in the 2008 season.



## 5.0 REFERENCES

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## **TABLES**

**TABLE 3-1. Summary of Soil Sample Data Adjacent to Blast Furnace Flue and Monier Flue**

0"-4" Depth Interval	Surface Soil Sample Site Number				Monitoring Well Soil Sample Site Number			
Parameter	UPS-SS1	UPS-SS2	UOS-SS3	UOS-SS5	DH-30	DH-46	DH-45	DH-39
ARSENIC (AS) TOT	437	115	8091	39				
COPPER (CU) TOT	690	87	23599	88				
CADMIUM (CD) TOT	3069	433	9319	40				
LEAD (PB) TOT	8813	573	71196	376				
ZINC (ZN) TOT	4628	481	34579	137				
<b>4"-12" Depth Interval</b>								
ARSENIC (AS) TOT	1068	140	6958	2394				
COPPER (CU) TOT	9395	39	11639	2075				
CADMIUM (CD) TOT	901	79	4012	346				
LEAD (PB) TOT	20116	193	66080	13621				
ZINC (ZN) TOT	11777	164	16607	4298				
<b>1'-2' Depth Interval</b>								
ARSENIC (AS) TOT	3100	236	1908	1504	1288	611	2186	386
COPPER (CU) TOT	64908	82	2622	2059	4970	660	4139	3487
CADMIUM (CD) TOT	213	179	1009	455	234	148	355	426
LEAD (PB) TOT	64307	619	16145	12560	11574	2734	9224	1801
ZINC (ZN) TOT	13830	394	6833	3830	26012	952	5629	10803
<b>2'-4' Depth Interval</b>								
ARSENIC (AS) TOT	130	101	1022	931	6523	595	1194	131
COPPER (CU) TOT	437	27	6447	736	110	643	1062	2007
CADMIUM (CD) TOT	107	<10	1847	497	2855	93	118	17
LEAD (PB) TOT	1483	26	11327	8720	19079	1794	3381	146
ZINC (ZN) TOT	912	41	12249	2944	1045	527	3674	16578
<b>4'-6' Depth Interval</b>								
ARSENIC (AS) TOT				1608	6739	308	2517	13
COPPER (CU) TOT				1492	111	329	3005	32
CADMIUM (CD) TOT				1367	3011	37	243	<10
LEAD (PB) TOT				15928	19549	1235	7468	33
ZINC (ZN) TOT				7173	1082	270	5287	1134
<b>6'-8' Depth Interval</b>								
ARSENIC (AS) TOT				475		250	561	
COPPER (CU) TOT				295		282	399	
CADMIUM (CD) TOT				148		<10	138	
LEAD (PB) TOT				1970		1658	1282	
ZINC (ZN) TOT				1121		391	928	
<b>8'-10' Depth Interval</b>								
ARSENIC (AS) TOT					754	218	793	14
COPPER (CU) TOT					190	270	281	33
CADMIUM (CD) TOT					1465	22	129	<10
LEAD (PB) TOT					127	1032	765	15
ZINC (ZN) TOT					1175	375	549	62
<b>10'-12' Depth Interval</b>								
ARSENIC (AS) TOT					731	470		18
COPPER (CU) TOT					89	315		29
CADMIUM (CD) TOT					1081	31		<10
LEAD (PB) TOT					127	914		<10
ZINC (ZN) TOT					1281	296		56
<b>15'-17' Depth Interval</b>								
ARSENIC (AS) TOT					160	153	472	12
COPPER (CU) TOT					76	88	71	38
CADMIUM (CD) TOT					1686	<10	816	<10
LEAD (PB) TOT					93	47	186	24
ZINC (ZN) TOT					774	123	2790	57
<b>20'-22' Depth Interval</b>								
ARSENIC (AS) TOT					502			13
COPPER (CU) TOT					138			66
CADMIUM (CD) TOT					610			<10
LEAD (PB) TOT					31			25
ZINC (ZN) TOT					1675			53

TOT = Total

All analytical values are in mg/Kg

Source: Appendices 2 and 7, Phase I RFI Report, ACI, 2003.

Note: Depth intervals have been normalized for comparison purposes. For example, the 4-6 foot increment in some samples may actually be a 3-5 foot sample increment. The actual sample increments are in the data reports included in Appendix 1

Shading = No data available for these depth intervals

TABLE 3-2. Summary Statistics for Surface Soils

## 0"-4" Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	173/183	2159	1028	0.01	35500	SS-12	3753	16.5	26	432
COPPER (CU) TOT	175/183	5522	3225	0.01	35750	RC-SA02D-1, 4/24/2001	6917	16.3	69	1127
CADMIUM (CD) TOT	167/183	1225	354	0.05	23400	SS-18	2830	0.24	816	196
LEAD (PB) TOT	177/183	16615	10875	0.01	73866	RC-SS17, 4/18/01	17967	11.6	296	3439
ZINC (ZN) TOT	179/183	13672	7916	0.05	88519	RC-SS25, 4/25/01	17388	46.9	63	2940

## 4"-12" Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	144/155	1133	503	0.10	8753	RC-SS05C-2, 4/6/2001	1518	16.5	17	276
COPPER (CU) TOT	148/155	2624	1319	0.10	16054	RC-SS05C-2, 4/6/2001	3421	16.3	37	604
CADMIUM (CD) TOT	136/155	662	239	0.05	13992	RC-SS06, 4/06/01	1436	0.24	535	128
LEAD (PB) TOT	152/155	12717	7125	0.05	77220	RC-SS07D, 4/09/01	16583	11.6	210	2431
ZINC (ZN) TOT	153/155	9791	6263	0.05	57288	RC-SA06, 4/24/01	11284	46.9	53	2492

## 1'-2' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	148/154	825	338	0.03	9256	UOS-SS11-3, 10/3/2001	1405	16.5	13	209
COPPER (CU) TOT	148/154	1999	790	0.01	64908	UPS-SS01-3, 3/20/2001	5521	16.3	26	416
CADMIUM (CD) TOT	121/154	415	111	0.02	10110	RC-SS06, 4/06/01	980	0.24	303	73
LEAD (PB) TOT	152/154	8147	3219	0.03	64307	UPS-SS01, 3/20/01	11119	11.6	136	1574
ZINC (ZN) TOT	153/154	6552	4166	0.05	35772	RC-SS20, 4/18/01	7035	46.9	38	1795

## 2'-3' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	116/128	518	130	0.012	4455	RC-SS06-4, 4/6/2001	906	16.5	6	97
COPPER (CU) TOT	122/128	1130	396	0.004	6741	RC-SS08-4, 4/9/2001	1579	16.3	14	229
CADMIUM (CD) TOT	92/128	397	44	0.003	13588	RC-SS06, 4/06/01	1316	0.24	174	42
LEAD (PB) TOT	123/128	5153	1193	0.003	37460	LOS-SS06, 4/06/01	7888	11.6	60	696
ZINC (ZN) TOT	127/128	6070	1731	0.032	56395	LOS-SS05, 4/05/01	9052	46.9	21	979

## 3'-5' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	36/39	300	165	10.00	1608	UOS-SS05-5, 4/17/2001	407	16.5	7	115
COPPER (CU) TOT	39/39	671	286	21.00	5763	UOS-SS07-5, 4/17/2001	1051	16.3	15	239
CADMIUM (CD) TOT	28/39	202	51	5.00	1430	RC-SS07C, 4/9/01	349	0.24	203	49
LEAD (PB) TOT	39/39	3547	1885	27.00	15928	UOS-SS05, 4/17/01	4456	11.6	93	1078
ZINC (ZN) TOT	39/39	3159	1000	45.00	12826	LOS-SS10, 4/6/01	3904	46.9	21	980

## 5'-8' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	30/31	304	49	11.00	2553	RC-SA08A-5, 4/25/2001	592	16.5	4	73
COPPER (CU) TOT	31/31	715	116	17.00	6181	RC-SS27-6, 4/9/2001	1339	16.3	11	185
CADMIUM (CD) TOT	24/31	131	32	5.00	741	RC-SS27, 4/9/01	188	0.24	170	41
LEAD (PB) TOT	31/31	5463	1593	23.00	26889	RC-SS27, 4/9/01	7733	11.6	109	1267
ZINC (ZN) TOT	31/31	4987	1354	46.00	39575	RC-SA06, 4/24/01	8190	46.9	26	1219

## 8'-11' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	4/4	408	181	16.00	1255	RC-SA08B-8, 4/25/2001	570	16.5	10	160
COPPER (CU) TOT	4/4	779	669	44.00	1734	RC-SA08B-8, 4/25/2001	704	16.3	26	429
CADMIUM (CD) TOT	2/4	68	8	5.00	251	RC-SA08B, 4/25/01	122	0.24	68	16
LEAD (PB) TOT	4/4	1126	182	176.00	3962	RC-SA08B, 4/25/01	1891	11.6	34	390
ZINC (ZN) TOT	4/4	2531	360	138.00	9265	RC-SA08B, 4/25/01	4492	46.9	13	618

TOT = Total

1/2 the detection limit used for non-detected values.

All analytical values are in mg/Kg

Source: Table 2-3-1, Phase I RFI Report, ACI, 2003.

**TABLE 3-3. Summary Statistics for Surface Soils in the Upper Ore Storage Area**

0"-4" Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	28/28	2010	1269	0.01	8091	UOS-SS3-1	2056	16.5	33	548
COPPER (CU) TOT	28/28	4161	3225	0.01	23599	UOS-SS3-1	5309	16.3	54	886
CADMIUM (CD) TOT	28/28	1949	582	0.10	14725	SS-4	3730	0.24	1446	347
LEAD (PB) TOT	28/28	15084	15954	0.02	71196	UOS-SS3-1	14736	11.6	325	3765
ZINC (ZN) TOT	28/28	8885	6578	0.09	44050	SS-4	10444	46.9	55	2600

4"-12" Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	25/25	1376	963	34	6958	UOS-SS3-2	1538	16.5	52	864
COPPER (CU) TOT	25/25	2386	1835	76	11639	UOS-SS3-2	2574	16.3	92	1503
CADMIUM (CD) TOT	25/25	590	356	11	4012	UOS-SS3, 4/27/01	917	0.24	1299	312
LEAD (PB) TOT	25/25	13675	11734	150	66080	UOS-SS3, 4/27/01	14344	11.6	683	7928
ZINC (ZN) TOT	25/25	6146	5283	119	16607	UOS-SS3, 4/27/01	4114	46.9	97	4550

1'-2' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	25/25	1556	931	2.00	9256	UOS-SS11-3	1977	16.5	42	700
COPPER (CU) TOT	25/25	2261	1993	0.02	7838	UOS-SS19-3	1879	16.3	60	981
CADMIUM (CD) TOT	24/25	367	251	0.41	1319	UOS-SS8, 4/17/01	380	0.24	678	163
LEAD (PB) TOT	25/25	13265	12839	0.14	40640	UOS-SS8, 4/17/01	10613	11.6	460	5331
ZINC (ZN) TOT	25/25	6609	6439	1.90	22911	UOS-SS4, 4/26/01	5345	46.9	71	3349

2'-3' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	23/31	1118	760	0.01	4337	UOS-SS13-4	1235	16.5	10	161
COPPER (CU) TOT	22/31	2131	1647	0.00	6729	UOS-SS7-4	2134	16.3	17	280
CADMIUM (CD) TOT	22/31	406	227	0.00	1847	UOS-SS3, 4/27/01	561	0.24	252	61
LEAD (PB) TOT	22/31	10521	6353	0.00	33343	UOS-SS13, 10/3/01	10156	11.6	112	1296
ZINC (ZN) TOT	23/31	5777	3577	0.03	16547	UOS-SS4, 4/26/01	5406	46.9	22	1021

3'-5' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	8/8	1005	653	15	3315	UOS-SS6-5	1083	16.5	28	468
COPPER (CU) TOT	8/8	1659	762	22	5763	UOS-SS7-5	2062	16.3	40	656
CADMIUM (CD) TOT	7/8	294	124	5	1367	UOS-SS5, 4/17/01	463	0.24	343	82
LEAD (PB) TOT	8/8	6611	4053	60	15928	UOS-SS5, 4/17/01	6642	11.6	235	2723
ZINC (ZN) TOT	8/8	3227	1995	49	8542	UOS-SS12, 10/03/01	3073	46.9	35	1659

TOT = Total

1/2 the detection limit used for non-detected values.

All analytical values are in mg/Kg

Source: Table 2-3-3, Phase I RFI Report, ACI, 2003.

TABLE 3-4. Summary Statistics for Surface Soils in the Unpaved On-Plant Site Area

0"-4" Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geomean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	19/19	2174	460	0.10	17075		3970	16.5	19	315
COPPER (CU) TOT	19/19	5119	1100	0.10	35350		8806	16.3	44	709
CADMIUM (CD) TOT	18/19	662	433	0.05	3069	UPS-SS1, 3/20/01	954	0.24	1121	269
LEAD (PB) TOT	18/19	9024	8813	0.05	39046	UPS-SS4, 3/16/01	10263	11.6	281	3256
ZINC (ZN) TOT	18/19	12039	6421	0.05	84650	SS-31	21706	46.9	71	3318

4"-12" Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	16/18	678	349	0.10	2148		723	16.5	10	160
COPPER (CU) TOT	18/18	1970	754	0.10	9395		2673	16.3	20	326
CADMIUM (CD) TOT	16/18	224	88	0.05	901	UPS-SS1, 3/20/01	267	0.24	263	63
LEAD (PB) TOT	17/18	7345	4625	0.05	24682	UPS-SS6, 3/20/01	7703	11.6	114	1322
ZINC (ZN) TOT	17/18	9619	7874	0.05	41322	UPS-SS14, 3/20/01	11105	46.9	33	1548

1'-2' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	14/15	610	164	0.10	3100		941	16.5	7	119
COPPER (CU) TOT	15/15	5385	206	0.10	64908		16574	16.3	17	274
CADMIUM (CD) TOT	11/15	92	38	0.05	312	UPS-SS13, 3/20/01	102	0.24	117	28
LEAD (PB) TOT	14/15	8304	968	0.05	64307	UPS-SS1, 3/20/01	17002	11.6	73	846
ZINC (ZN) TOT	14/15	4921	1647	0.05	22123	UPS-SS12, 3/16/01	6868	46.9	15	722

2'-4' Depth Interval

Parameter	Detection Frequency	Arithmetic Mean	Median	Minimum	Maximum	Location of Maximum	Standard Deviation	Geo. Mean Background	Enrichment Factor	Geometric Mean
ARSENIC (AS) TOT	12/13	165	130	10	465		162	16.5	5	84
COPPER (CU) TOT	13/13	778	147	14	3522		1095	16.3	13	218
CADMIUM (CD) TOT	8/13	35	17	5	107	UPS-SS1, 3/20/01	35	0.24	80	19
LEAD (PB) TOT	13/13	2080	932	23	9636	UPS-SS13, 3/20/01	2884	11.6	52	598
ZINC (ZN) TOT	13/13	7881	532	15	41455	UPS-SS13, 3/20/01	13187	46.9	18	852

TOT = Total

1/2 the detection limit used for non-detected values.

All analytical values are in mg/Kg

Source: Table 2-3-3, Phase I RFI Report, ACI, 2003.

TABLE 3-5. BLAST FURNACE FLUE AND MONIER FLUE UNPAVED EXPOSED AREA SOIL SAMPLE COLLECTION AND ANALYSIS MATRIX

Sample Location	Purpose	Sample Types and Depth Intervals <sup>(1)</sup>	Number of Sampling Events	Sampling Standard Operating Procedures	Analytical Parameters	Methods	Project Detection Limit Goal	Excavation Concentration Removal Limits (mg/kg or ppm)	Soil Excavation Removal and Sampling Protocols in Unpaved Bare Soil Areas Within the Flue Demolition Foot Print Area
Blast Furnace Flue Foot Print	Remove flue dust and impacted soils in exposed or unpaved areas within the structure demolition foot print. Determine depth of excavation.	Sample from Excavator Bucket. Sample intervals: 0-4" 4"-12" 1'-2' 2'-4' 4'-6' 6'-8' 8'-10' 10'-12' 13-15	1	HF-SOP-2 HF-SOP-4 HF-SOP-5 HF-SOP-7 HF-SOP-29 HF-SOP-31 HF-SOP-58 HS-SOP-6 HS-SOP-13 HS-SOP-57	As Cd Cu Pb Zn	XRF XRF XRF XRF XRF	10 ppm 10 ppm 10 ppm 10 ppm 10 ppm	653 762 124 4053 1995 Source: Table 3-3, arithmetic mean for the 3 to 5 foot increment.	Obvious flue dust or flue dust soils is removed based on visual observation (fine texture, dark gray color). Excavation continues until: - The values for As, Cd, Cu, Pb, Zn are below removal limits - The practical limit of excavation equipment is reached (typically 12 to 15 feet) - The water table is encountered. The final sample increment is retained and analyzed for SPLP.
	Document metal concentrations in test leachate from the SPLP testing procedure	Final increment sampled from excavator bucket and sampled for metals and analyzed by XRF	1		As Cd Cu Pb Zn	SPLP (EPA 1312) SPLP (EPA 1312) SPLP (EPA 1312) SPLP (EPA 1312) SPLP (EPA 1312)	0.1 mg/l 0.1 mg/l 0.1 mg/l 0.1 mg/l 0.1 mg/l		
Monier Flue Foot Print	Remove flue dust and impacted soils in exposed or unpaved areas within the structure demolition foot print.	Sample from Excavator Bucket. Sample intervals: 0-4" 4"-12" 1'-2' 2'-4' 4'-6' 6'-8' 8'-10' 10'-12' 13-15	1	HF-SOP-2 HF-SOP-4 HF-SOP-5 HF-SOP-7 HF-SOP-29 HF-SOP-31 HF-SOP-58 HS-SOP-6 HS-SOP-13 HS-SOP-57	As Cd Cu Pb Zn	XRF XRF XRF XRF XRF	10 ppm 10 ppm 10 ppm 10 ppm 10 ppm	165 778 35 2080 7881 Source: Table 3-4, arithmetic mean for the 2 to 4 foot increment.	Obvious flue dust or flue dust soils is removed based on visual observation (fine texture, dark gray color). Excavation continues until: - The values for As, Cd, Cu, Pb, Zn are below removal limits - The practical limit of excavation equipment is reached (typically 12 to 15 feet) - The water table is encountered. The final sample increment is retained and analyzed for SPLP.
	Document metal concentrations in test leachate from the SPLP testing procedure	Final increment sampled from excavator bucket and sampled for metals and analyzed by XRF	1		As Cd Cu Pb Zn	SPLP (EPA 1312) SPLP (EPA 1312) SPLP (EPA 1312) SPLP (EPA 1312) SPLP (EPA 1312)	0.1 mg/l 0.1 mg/l 0.1 mg/l 0.1 mg/l 0.1 mg/l		

(1) Sample depths are approximate; actual depths will be based on field conditions.

(2) Duplicates will be collected at a minimum frequency of 1 per 20 field samples. Duplicates for SPLP analysis will be submitted at a frequency of 1 per 20 samples selected for SPLP.

(3) Detection limits for SPLP analysis have been set at 100x below regulatory limits.

(4) Sample site locations will be surveyed by GPS during or after samples are collected.



**TABLE 3-6 PRIORITY OF MAINTENANCE TASKS**

Priority	Type of Maintenance	Description and Example
1	Emergency	A situation requiring immediate attention (for example, fire or flood).
2	Preventative	Scheduled inspection and minor repairs carried out during inspection (for example, cleaning of membrane liner).
3	Corrective	Corrective maintenance required as a direct result of scheduled inspection (for example, repair of torn membrane liner).
4	Housekeeping	Routine housekeeping of buildings and grounds (for example, disposal of debris and general housekeeping).

**TABLE 3-7 EMERGENCY NOTIFICATION  
CONTACTS AND PHONE NUMBERS**

**General Emergency Numbers:**

Fire Department	911
Ambulance	911
Police	911

**Corporate Resources**

**ASARCO LLC**

Blaine Cox	(East Helena Smelter) Cell	(406) 227-4098 (406) 459-8542
Jon Nickel	(East Helena Smelter)	(406) 227-4529

**OTHER RESOURCES:**

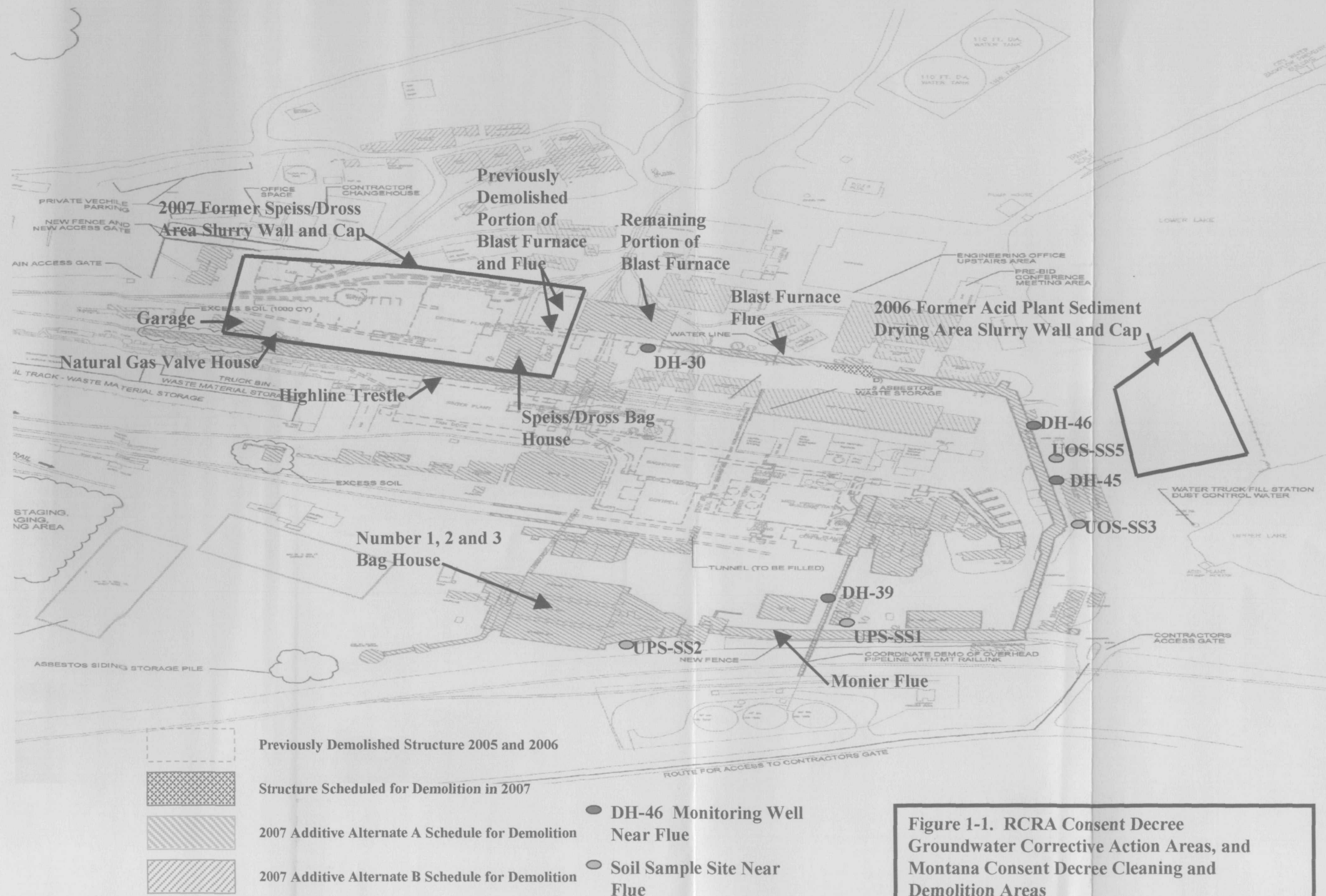
U.S. EPA (24-hour emergency)	(206) 553-1263
Superfund/RCRA Hotline	(800) 424-9346
Hydrometrics, Inc	(406) 443-4150

## FIGURES

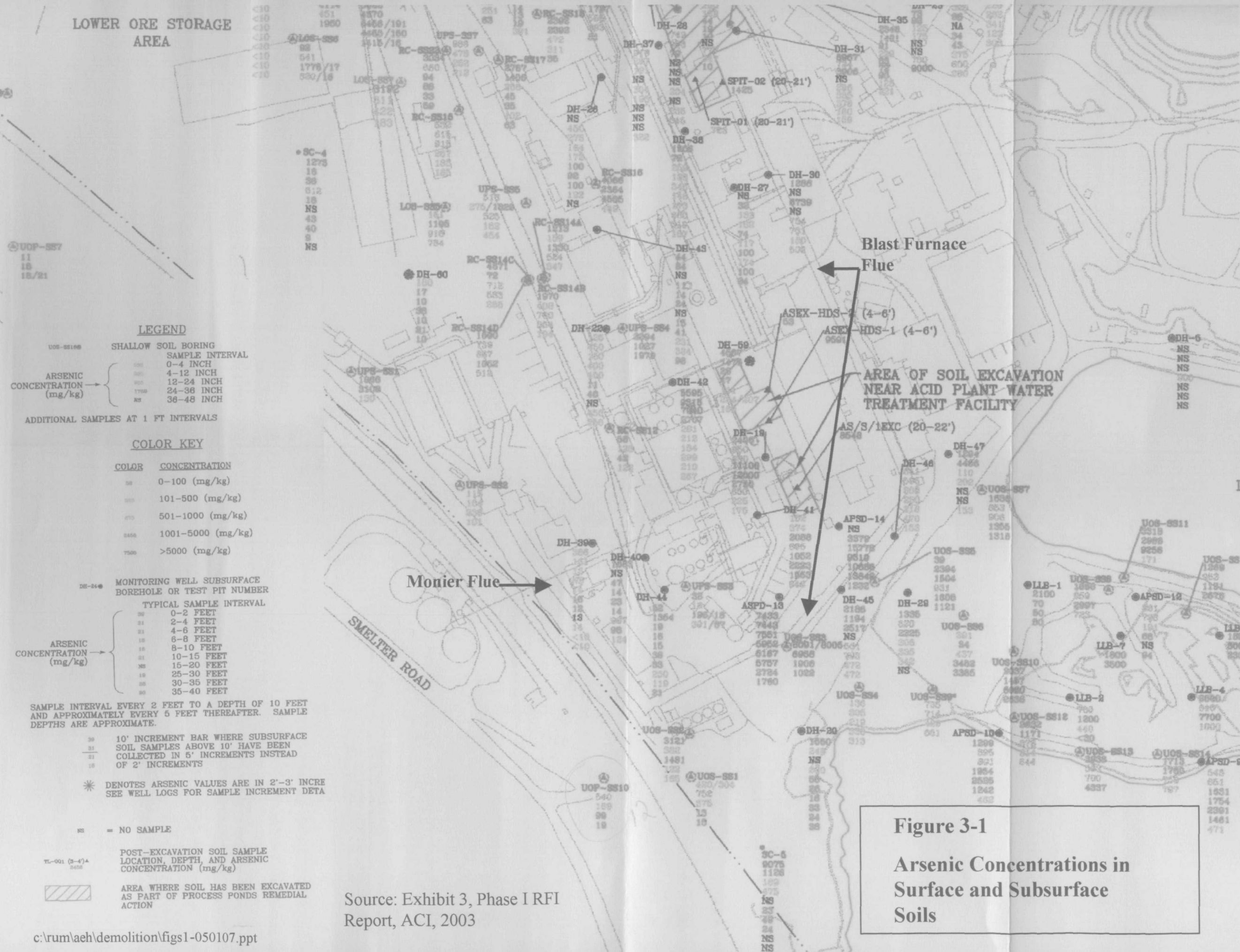
# Color Map(s)

The following pages  
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(303) 312-6473.



**Figure 1-1. RCRA Consent Decree Groundwater Corrective Action Areas, and Montana Consent Decree Cleaning and Demolition Areas**



Source: Exhibit 3, Phase I RFI Report, ACI, 2003

**Figure 3-1**  
**Arsenic Concentrations in Surface and Subsurface Soils**





Project No.: 6052				Hydrometrics, Inc.				ASARCO LLC - EAST HELENA PLANT				DRAWING FILE NUMBER			
DRAWN BY: JED				Consulting Scientists and Engineers				2007 CLEANING & DEMOLITION PROJECT				605202HQ15.dwg			
CHECKED BY: MJK				Helena, Montana 59601				TEMPORARY CAP PHASE IV -				AUTOCAD 2004 DRAWING (DWG)			
APPROVED BY: MJD				8000 Redwood Avenue				PLAN				SHEET NUMBER			
SCALE: 1"=80'				(505) 443-4100								15			

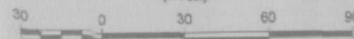
**Figure 3-2**

**Temporary Cap Plan for 2007  
Cleaning and Demolition**

# NOTES

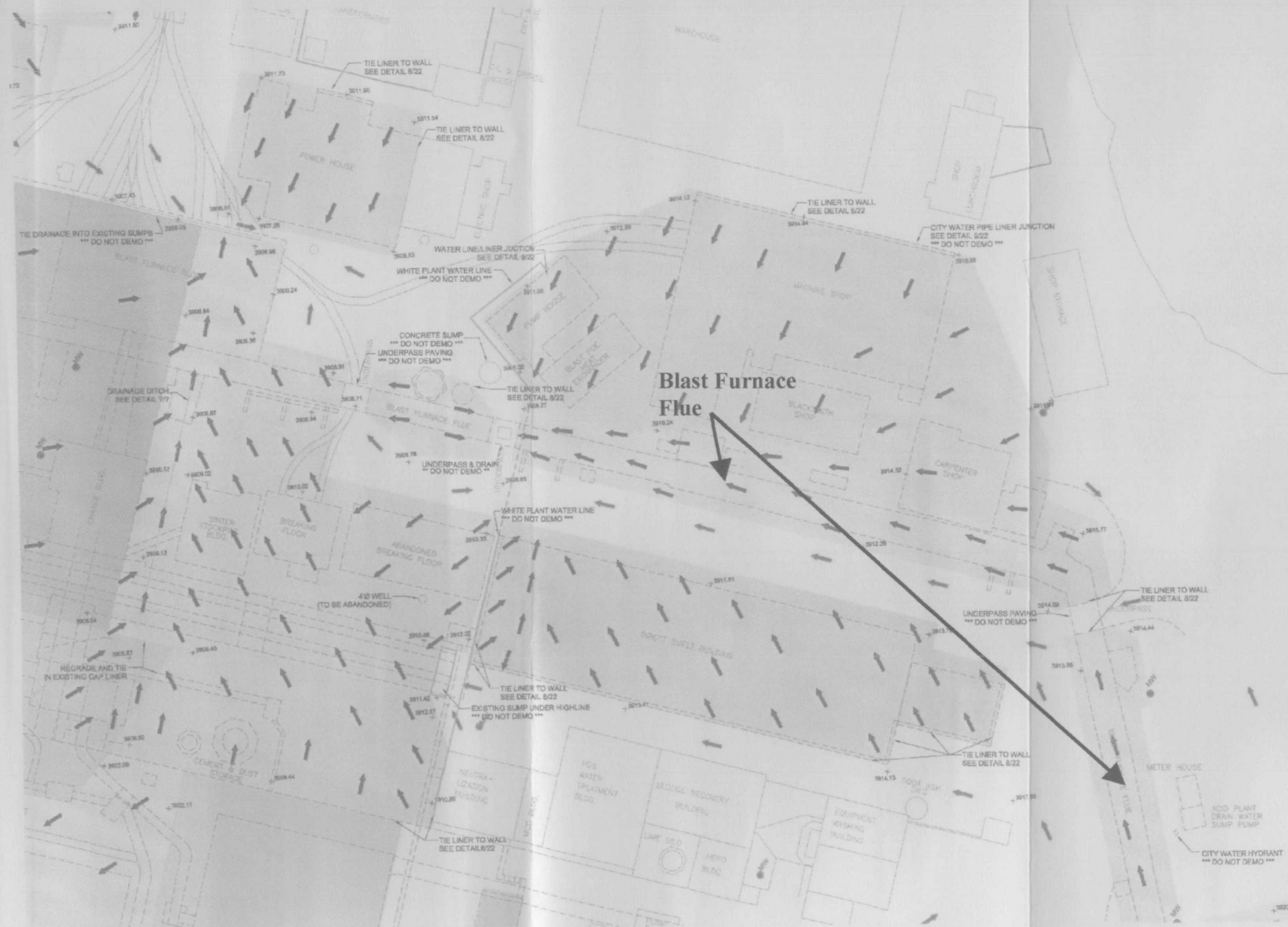
1. PREPARE SUBGRADE BY REMOVING ANY EXPOSED METAL OR SHARP OBJECTS.
2. USE FILLING FINE SLAG OR OTHER MATERIAL SUITABLE AS ON-SITE BORROW TO BRING LOW AREAS AND DEPRESSIONS UP TO A GRADE THAT ENSURES DRAINAGE OF THE CAP TO THE SITE STORMWATER DRAIN SYSTEM.
3. OVERLAP NON-WOVEN GEOTEXTILE A MINIMUM OF 12 INCHES. Z-FOLD AND STITCH REINFORCED POLYETHYLENE (RPE) GEOMEMBRANE AT ALL SEAMS.
4. IN AREAS WHERE LINERS WILL BUTT AGAINST CONCRETE FOUNDATIONS, ATTACH WITH 2"x4" TREATED TIMBERS WRAPPED WITH AT LEAST ONE FULL WRAP IN THE LINER AND ANCHORED TO THE CONCRETE WITH CONCRETE'S ANCHOR BOLTS AS ADDITIONAL SUPPORT USE A SIKA-FLEX CAULK TO SEAL BETWEEN THE LINER AND THE CONCRETE.
5. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN QUANTITY ESTIMATES AND NUMBERS PROVIDED ON PLANS ARE FOR INFORMATION ONLY.
6. COMPLETE MONITORING WELL EXTENSIONS IN ACCORDANCE WITH MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (MDNR) MONITORING WELL REGULATIONS AND BY A LICENSED MONITORING WELL CONSTRUCTOR.
7. COMPLETE LINER JUNCTIONS AT MONITORING WELLS, POWER POLES, AND WATER LINES ACCORDING TO DETAIL 8/22.
8. GRADE TRANSITIONS BETWEEN EXISTING 2008 TEMPORARY CAP AND 2007 TEMPORARY CAP LINERS SO THAT WATER IS ABLE TO FLOW IN THE DIRECTION SHOWN WITHOUT PONDING. OVERLAP TRANSITIONS AS DESCRIBED IN NOTES 3 AND 4.
9. ENSURE CAP GRADE EXCEEDS 1.5% CAPS EXCEEDING GRADES OF 3% REQUIRE CONTINUOUS LINES OF SANDSAGE ON 5' SPACING.

SCALE  
(in Feet)



## LEGEND

- 2007 AND PRIOR DEMOLITION WORK
- EXISTING STRUCTURES
- 2008 TEMPORARY CAP
- 2007 TEMPORARY CAP
- 2007 ADDITIVE ALTERNATIVE "A" TEMPORARY CAP
- 2007 ADDITIVE ALTERNATIVE "B" TEMPORARY CAP
- 2007 TEMPORARY CAP - TO BE DONE BY OTHERS
- MONITORING WELL - DO NOT DEMO
- SURFACE WATER DRAINAGE INLET AREAS (GRAVITY FLOW)
- SURFACE WATER DRAINAGE FLOW IN CAPPED AREAS
- SURFACE WATER DRAINAGE FLOW IN UNCAPPED AREAS
- SURVEY POINTS (EXISTING GROUND ELEVATIONS)



NO.	BY	DATE	DESCRIPTION

NO.	BY	DATE	DESCRIPTION

SCALE VERIFICATION  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1  
IF NOT ONE INCH ON  
THIS SHEET, ADJUST  
SCALES ACCORDINGLY

Project No.: 6052  
DRAWN BY: JRD 1/17/07  
CHECKED BY: WJR 1/18/07  
APPROVED BY: WJD 1/18/07  
SCALE: 1"=30'

**Hydrometrics, Inc.**  
Consulting Scientists and Engineers  
Helena, Montana 59601  
5025 Broadway Avenue  
(406) 443-6800

ASARCO LLC - EAST HELENA PLANT  
2007 CLEANING & DEMOLITION PROJECT  
TEMPORARY CAP PHASE IV -  
STAGE 2 & ADDITIVE ALTERNATIVE "A"

DRAWING FILE NUMBER  
605202H020.dwg  
AUTOCAD 2004 DRAWING (DWG)  
SHEET NUMBER  
20

**Figure 3-3**  
**Temporary Cap Plan and Drainage Plan for**  
**the Blast Furnace Flue Areas**



# NOTES:

1. PREPARE SUBGRADE BY REMOVING ANY EXPOSED METAL OR SHARP OBJECTS.
2. USE FILLED FINE SLAG OR OTHER MATERIAL SUITABLE AS ON-SITE BORROW TO BRING LOW AREAS AND DEPRESSIONS UP TO A GRADE THAT ENSURES DRAINAGE OF THE CAP TO THE SITE STORMWATER DRAIN SYSTEM.
3. OVERLAP NON-WOVEN GEOTEXTILE A MINIMUM OF 12 INCHES.
4. 2 FOLD AND BITCH REINFORCED POLYETHYLENE (RPE) GEOMEMBRANE AT ALL SEAMS.
5. IN AREAS WHERE LINERS WILL BUTT AGAINST CONCRETE FOUNDATIONS ATTACH WITH 2"x4" TREATED TIMBERS WRAPPED WITH AT LEAST ONE FULL WRAP IN THE LINER AND ANCHORED TO THE CONCRETE WITH CONCRETE ANCHOR BOLTS AS ADDITIONAL SUPPORT USE A SYKA-FLEX CAULK TO SEAL BETWEEN THE LINER AND THE CONCRETE.
6. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN QUANTITY ESTIMATES AND NUMBERS PROVIDED ON PLANS ARE FOR INFORMATION ONLY.
7. COMPLETE MONITORING WELL EXTENSIONS IN ACCORDANCE WITH MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (MNR) MONITORING WELL REGULATIONS AND BY A LICENSED MONITORING WELL CONSTRUCTOR.
8. COMPLETE LINER JUNCTIONS AT MONITORING WELLS, POWER POLES, AND WATER LINES ACCORDING TO DETAIL 8/22.
9. GRADE TRANSITIONS BETWEEN EXISTING 2006 TEMPORARY CAP AND 2007 TEMPORARY CAP LINERS SO THAT WATER IS ABLE TO FLOW IN THE DIRECTION SHOWN WITHOUT POONDING. OVERLAP TRANSITIONS AS DESCRIBED IN NOTES 3 AND 4.
10. ENSURE CAP GRADE EXCEEDS 1.5% CAPS EXCEEDING GRADES OF 3% REQUIRE CONTINUOUS LINES OF SANDBAGS ON 5' SPACING.



## LEGEND

- 2007 AND PRIOR DEMOLITION WORK
- EXISTING STRUCTURES
- 2006 TEMPORARY CAP
- 2007 TEMPORARY CAP
- 2007 ADDITIVE ALTERNATIVE 'A' TEMPORARY CAP
- MONITORING WELL - DO NOT DEMO
- SURFACE WATER DRAINAGE INLET AREAS (GRAVITY FLOW)
- SURFACE WATER DRAINAGE FLOW IN CAPPED AREAS
- SURFACE WATER DRAINAGE FLOW IN UNCAPPED AREAS
- SURVEY POINTS (EXISTING GROUND ELEVATIONS)

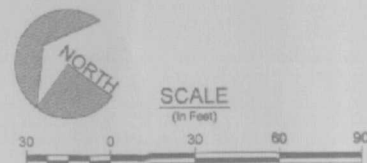


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								IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	CHECKED BY	VWR	3/19/07	TEMPORARY CAP PHASE IV - STAGE 2	ALTCAD 2004 DRAWING (DWG)
									APPROVED BY	MJO			SHEET NUMBER
									SCALE:	1"=30'			18
													REV

**Figure 3-4**  
**Temporary Cap Plan and Drainage Plan for the**  
**Blast Furnace Flue and Monier Flue Areas**

# NOTES:

1. PREPARE SUBGRADE BY REMOVING ANY EXPOSED METAL OR SHARP OBJECTS.
2. USE FUMED FINE SLAG OR OTHER MATERIAL SUITABLE AS ON-SITE SORROW TO BRING LOW AREAS AND DEPRESSIONS UP TO A GRADE THAT ENSURES DRAINAGE OF THE CAP TO THE SITE STORMWATER DRAIN SYSTEM.
3. OVERLAP NON-WOVEN GEOTEXTILE A MINIMUM OF 12 INCHES.
4. 2-FOLD AND STITCH REINFORCED POLYETHYLENE (RPE) GEOMEMBRANE AT ALL SEAMS.
5. IN AREAS WHERE LINERS WILL BUTT AGAINST CONCRETE FOUNDATIONS, ATTACH WITH 2"x4" TREATED TIMBERS WRAPPED WITH AT LEAST ONE FULL WRAP IN THE LINER AND ANCHORED TO THE CONCRETE WITH CONCRETE ANCHOR BOLTS AS ADDITIONAL SUPPORT USE A SIKA-FLEX CAULK TO SEAL BETWEEN THE LINER AND THE CONCRETE.
6. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN QUANTITY ESTIMATES AND NUMBERS PROVIDED ON PLANS ARE FOR INFORMATION ONLY.
7. COMPLETE MONITORING WELL EXTENSIONS IN ACCORDANCE WITH MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (MONTANA) MONITORING WELL REGULATIONS AND BY A LICENSED MONITORING WELL CONSTRUCTOR.
8. COMPLETE LINER JOINTS AT MONITORING WELLS, POWER POLES, AND WATER LINES ACCORDING TO DETAIL 9/22.
9. GRADE TRANSITIONS BETWEEN EXISTING 2006 TEMPORARY CAP AND 2007 TEMPORARY CAP LINERS SO THAT WATER IS ABLE TO FLOW IN THE DIRECTION SHOWN WITHOUT PONING. OVERLAP TRANSITIONS AS DESCRIBED IN NOTES 3 AND 4.
10. ENSURE CAP GRADE EXCEEDS 1.5%. CAPS EXCEEDING GRADES OF 30% REQUIRE CONTINUOUS LINES OF SANDBAGS ON 5' SPACING.



## LEGEND

- 2007 AND PRIOR DEMOLITION WORK
- EXISTING STRUCTURES
- 2006 TEMPORARY CAP
- 2007 TEMPORARY CAP
- MW MONITORING WELL - DO NOT DEMO
- SURFACE WATER DRAINAGE INLET AREAS (GRAVITY FLOW)
- SURFACE WATER DRAINAGE FLOW IN CAPPED AREAS
- SURFACE WATER DRAINAGE FLOW IN UNCAPPED AREAS
- SURVEY POINTS (EXISTING GROUND ELEVATIONS)



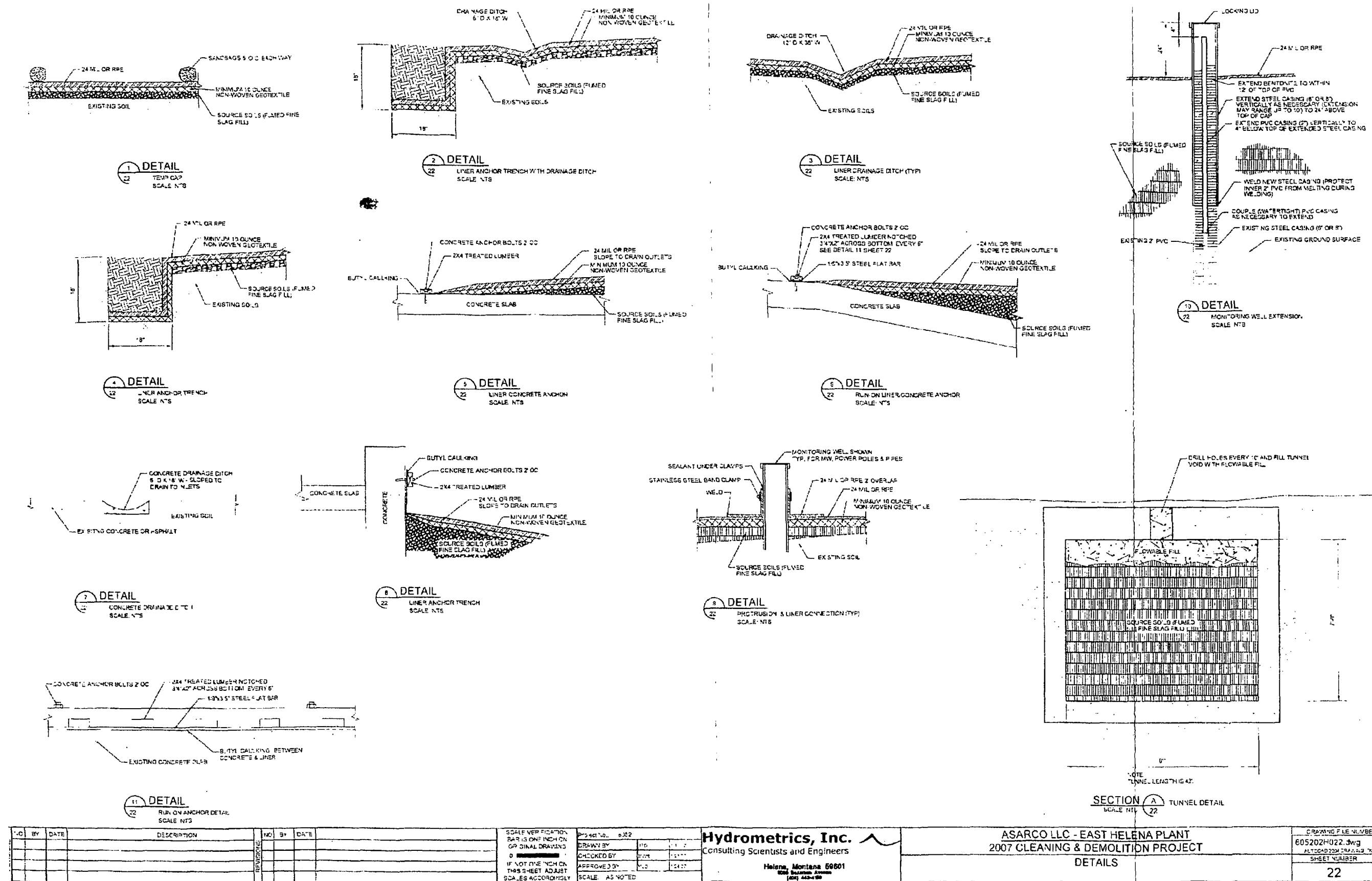
Monier Flue

NO	BY	DATE	DESCRIPTION	NO	BY	DATE	DESCRIPTION

SCALE VERIFICATION BAR IS ONE INCH ON ORIGINAL DRAWING 0 1 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	Project No.: 6052 DRAWN BY: JSD 11/1/07 CHECKED BY: MWR 11/1/07 APPROVED BY: MJC 11/1/07 SCALE: 1"=30'	<b>Hydrometrics, Inc.</b> Consulting Scientists and Engineers Helena, Montana 59601 3000 Broadway Avenue (406) 443-4100	ASARCO LLC - EAST HELENA PLANT 2007 CLEANING & DEMOLITION PROJECT TEMPORARY CAP PHASE IV - STAGE 2	DRAWING FILE NUMBER 605202H017.dwg AUTOCAD 2004 DRAWING (DWG) SHEET NUMBER 17
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**Figure 3-5**  
**Temporary Cap Plan and Drainage Plan for the**  
**Monier Flue**



# Color Chart(s)

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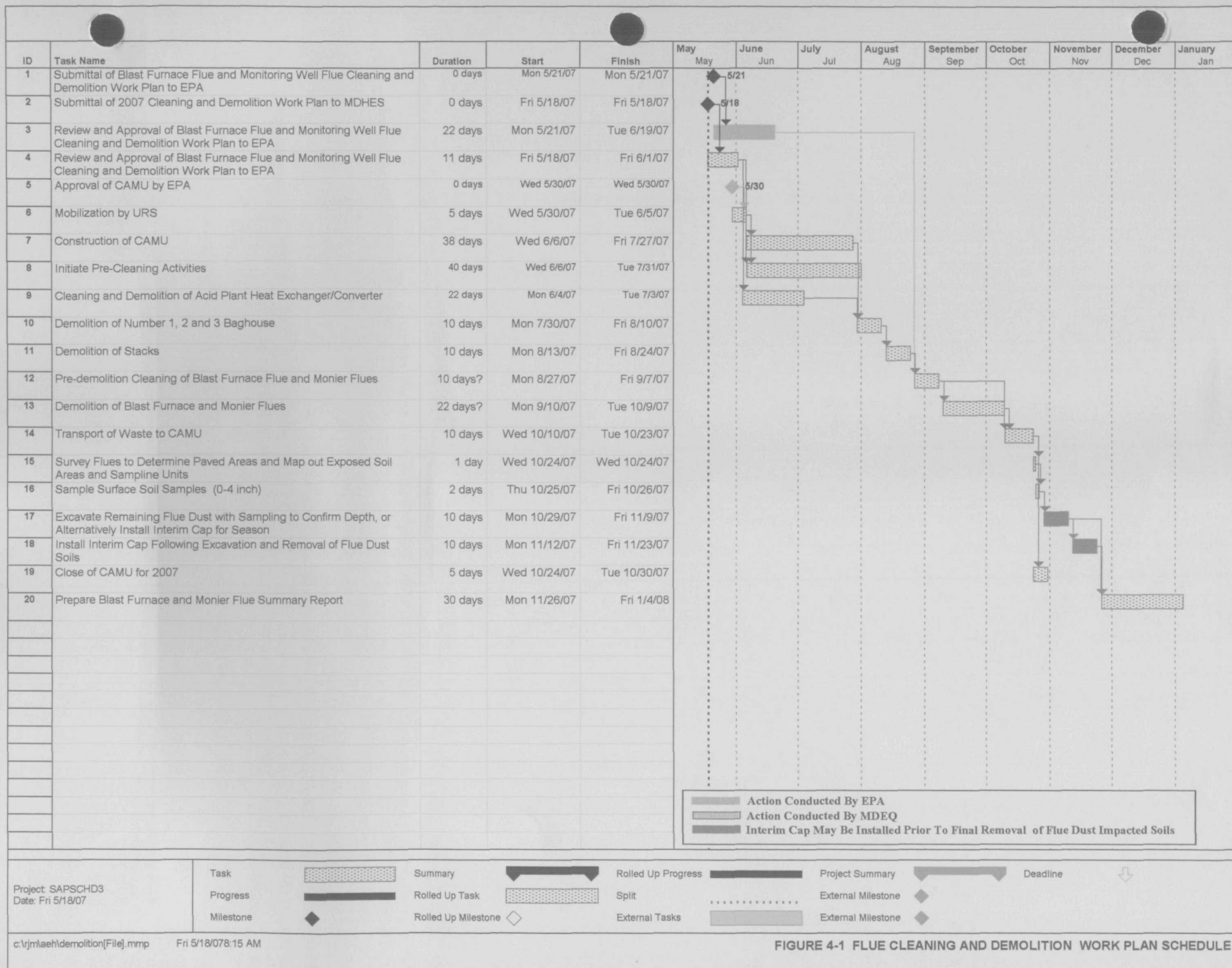


FIGURE 4-1 FLUE CLEANING AND DEMOLITION WORK PLAN SCHEDULE

## APPENDICES

## **APPENDIX A**

### **SURFACE AND SUBSURFACE SOIL SAMPLE DATA FOR LOCATIONS NEAR OR ADJACENT TO THE BLAST FURNACE FLUE AND MONIER FLUE**

# ASARCO EAST HELENA RFI SOIL SAMPLING

**SITE: UPS-SS01**

Date	Time	Sample Code	Depth Interval	Description	Concentrations				
					As	Cd	Cu	Pb	Zn
03/20/01	1430	UPS-SS01-1	0-4"	Light brown to green brown clayey silty sand; sand fine to coarse; 20% gravels; moist; intermittent areas with high clay content.	437	3069	690	8813	4628
	1435	UPS-SS01-1D	0-4"	Light brown to green brown clayey silty sand; sand fine to coarse; 20% gravels; moist; intermittent areas with high clay content.	394	2690	851	8455	4425
	1440	UPS-SS01-2	4-12"	Intermittent areas of 1) dark brown angular sands and gravels; moist; 10% fines; 2) sandy silt with clay stringers; and 3) discolored zones ranging from bright green to yellow to orange (within the silty sand).	1068	901	9395	20116	11777
	1445	UPS-SS01-3	12-24"	Bright green clayey silt; wet; not present everywhere; where not present - native material below appears.	3100	213	64908	64307	13830
	1450	UPS-SS01-4	24-36"	Clayey sandy silt; light brown; 10% gravels; moist; intermittent clay stringers.	130	107	437	1483	912



# ASARCO EAST HELENA RFI SOIL SAMPLING

**SITE: UPS-SS02**

Date	Time	Sample Code	Depth Interval	Description	Concentrations				
					As	Cd	Cu	Pb	Zn
03/16/01	1000	UPS-SS02-1	0-4"	Dark brown sandy silt; sand is fine grained; moist; frozen, compacted <10% gravel. Intermittent clay lenses approximately 1-2" thick.	115	433	87	573	481
	1005	UPS-SS02-2	4-12"	Dark brown sandy silt; sand is fine grained; moist; frozen, compacted <10% gravel. Intermittent clay lenses approximately 1-2" thick.	140	79	39	193	164
	1010	UPS-SS02-3	12-24"	Dark brown sandy silt; sand is fine grained; moist; frozen, compacted <10% gravel. Intermittent clay lenses approximately 1-2" thick.	236	179	82	619	394
	1015	UPS-SS02-4	24-36"	Dark brown sandy silt; sand is fine grained; moist; frozen, compacted <10% gravel. Intermittent clay lenses approximately 1-2" thick.	101	<10	27	26	41

# ASARCO EAST HELENA RFI SOIL SAMPLING

**SITE: UOS-SS03**

Date	Time	Sample Code	Depth Interval	Description	Concentrations				
					As	Cd	Cu	Pb	Zn
04/27/01	0930	UOS-SS03-1	0-4"	Sand and gravel debris; yellow to dark gray; some asphalt; ash, very contaminated.	8091	9319	23599	71196	34579
	0935	UOS-SS03-1D	0-4"	Sand and gravel debris; yellow to dark gray; some asphalt; ash, very contaminated.	8005	7205	26721	70553	30190
	0940	UOS-SS03-2	4-12"	4-6" - Sand gravel debris; yellow to dark gray; some asphalt; ash. 6-10" - White/yellow gravelly clay; gravel is weathered and angular, fragmented; brick and slag debris; firm. 10-12" - Slag - gravel and cobble size.	6958	4012	11639	66080	16607
	0945	UOS-SS03-3	12-24"	Slag - gravel and cobble size.	1908	1009	2622	16145	6833
			24-28"	Slag; gravel and cobble size/fill.	ND	ND	ND	ND	ND
			28-31"	Fine slag (fine sand to coarse sand size) with a sand size orange debris (looks like brick).	ND	ND	ND	ND	ND
	0950	UOS-SS03-4	24-36"	24-28" - Slag; gravel and cobble size. 28-32" - Fine slag with sand size orange debris/brick. 32-36" - Brown gravelly sandy clay; firm; gravels coarse, 10%; sand fine to coarse, 15%, brick and slag debris.	1022	1847	6447	11327	12249

# ASARCO EAST HELENA RFI SOIL SAMPLING

SITE: UOS-SS05

Date	Time	Sample Code	Depth Interval	Description	Concentrations				
					As	Cd	Cu	Pb	Zn
04/17/01	1500	UOS-SS05-1	0-4"	Brown sand and gravel; sand poorly sorted, fine to coarse; gravels fine to coarse; <10% fines; moist to wet.	39	40	88	376	137
	1505	UOS-SS05-2	4-12"	4-6" - Brown sand and gravel; poorly sorted fine to coarse sand; fine to coarse gravels; <10% fines. 6-12" - Dark brown/black/gray; slag pieces; fine to coarse; brick debris; intermittent brown and gray clays; more clay with depth approximately up to 30% at depth.	2394	346	2075	13621	4298
	1510	UOS-SS05-3	12-24"	Dark brown/black/gray; slag pieces; fine to coarse; brick debris; intermittent brown and gray clays; more clay with depth approximately up to 30% at depth.	1504	455	2059	12560	3830
	1515	UOS-SS05-4	24-36"	Dark brown/black/gray; slag pieces; fine to coarse; brick debris; intermittent brown and gray clays; more clay with depth approximately up to 30% at depth.	931	497	736	8720	2944
	1520	UOS-SS05-5	36-60"	Dark brown/black/gray; slag pieces; fine to coarse; brick debris; intermittent brown and gray clays; more clay with depth approximately up to 30% at depth.	1608	1367	1492	15928	7173
	1525	UOS-SS05-6	60-72"	Coarse sand, poorly sorted, wet.	475	148	295	1970	1121

-- SAMPLE TYPE: SOIL --

SITE CODE	DH-29S	DH-29S	DH-29S	DH-30	DH-30
SAMPLE DATE	12/11/1987	12/11/1987	12/11/1987	11/20/1999	11/20/1999
SAMPLE TIME				14:00	14:35
LAB	TSC-SLC	TSC-SLC	VERSR	EHLAB	EHLAB
LAB NUMBER				99X-05094	99X-05095
REMARKS			SPLIT		
TYPE	TOTAL	TOTAL	TOTAL	XRF	XRF
DEPTH	8-10	10-12	10-12	1-3'	3.5-5.5'
SAMPLE NUMBER	HYD-8107.A14	HYD-8108.A14	HYD-8109.A14	IMMS-9910-270	IMMS-9910-271

0-2 4-6

-- PHYSICAL PARAMETERS --

PH	6.9	6.9
----	-----	-----

-- MAJOR CONSTITUENTS --

MAGNESIUM (MG) DIS	3410.0
SODIUM (NA) DIS	658.0
POTASSIUM (K) DIS	1990.0

-- METALS & MINOR CONSTITUENTS --

ARSENIC (AS) TOT	335.0	342.0	1288.0	6739.0
CADMIUM (CD) TOT	40.0	27.0	234.0	3011.0
COPPER (CU) TOT	578.0	1058.0	699.0	4970.0
IRON (FE) TOT	18610.0	45325.0	37000.0	
IRON (FE) (%) TOT				10.0
LEAD (PB) TOT	5070.0	9523.0	6330.0	11574.0
MANGANESE (MN) TOT	625.0	2748.0	2190.0	3985.0
MERCURY (HG) TOT			6.6	
NICKEL (NI) TOT			12.0	
ZINC (ZN) TOT	3250.0	9350.0	26012.0	1082.0

-- OTHER PARAMETERS --

COARSE FRAGMENTS (%)	27.13	78.47
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	DH-30	DH-30	DH-30	DH-30	DH-30
SAMPLE DATE	11/20/1999	11/20/1999	11/20/1999	11/21/1999	11/21/1999
SAMPLE TIME	14:40	16:00	16:45	10:30	11:00
LAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB
LAB NUMBER	99X-05096	99X-05097	99X-05098	99X-05099	99X-05100
REMARKS	DUPLICATE				
TYPE	XRF	XRF	XRF	XRF	XRF
DEPTH	3.5-5.5'	8-10'	10-12'	15-17'	20-22'
SAMPLE NUMBER	IMMS-9910-271D	IMMS-9910-272	IMMS-9910-273	IMMS-9910-274	IMMS-9910-275

## -- METALS &amp; MINOR CONSTITUENTS --

	6523.0	754.0	731.0	160.0	502.0
ARSENIC (AS) TOT	6523.0	754.0	731.0	160.0	502.0
CADMIUM (CD) TOT	2855.0	1465.0	1081.0	1686.0	610.0
COPPER (CU) TOT	110.0	190.0	89.0	76.0	138.0
IRON (FE) (%) TOT	2.0	3.0	3.0	3.0	4.0
LEAD (PB) TOT	19079.0	127.0	127.0	93.0	31.0
MANGANESE (MN) TOT	426.0	318.0	694.0	2093.0	579.0
ZINC (ZN) TOT	1045.0	1175.0	1281.0	774.0	1675.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	DH-46	DH-46	DH-46	DH-46	DH-46	DH-46
SAMPLE DATE	11/23/1999	11/23/1999	11/23/1999	11/23/1999	11/23/1999	11/23/1999
SAMPLE TIME	10:45	10:50	10:55	11:15	11:45	14:00
LAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB
LAB NUMBER	99X-05163	99X-05164	99X-05165	99X-05166	99X-05167	99X-05168
REMARKS		DUPLICATE				
TYPE	XRF	XRF	XRF	XRF	XRF	XRF
DEPTH	0.5-2.5'	0.5-2.5'	2.5-4.5'	4.5-6.5'	6.5-8.5'	8.5-10.5'
SAMPLE NUMBER	IMMS-9910-282	IMMS-9910-282D	IMMS-9910-283	IMMS-9910-284	IMMS-9910-285	IMMS-9910-286
	0-2		2-4	4-6	6-8	8-10
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	611.0	526.0	595.0	308.0	250.0	218.0
CADMIUM (CD) TOT	148.0	138.0	93.0	37.0	< 10.0	22.0
COPPER (CU) TOT	660.0	549.0	643.0	329.0	282.0	270.0
IRON (FE) (%) TOT	2.0	2.0	3.0	3.0	3.0	3.0
LEAD (PB) TOT	2734.0	2439.0	1794.0	1235.0	1658.0	1032.0
MANGANESE (MN) TOT	518.0	515.0	533.0	473.0	467.0	492.0
ZINC (ZN) TOT	952.0	856.0	527.0	270.0	391.0	375.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	DH-46	DH-46	DH-47	DH-47	DH-47
SAMPLE DATE	11/23/1999	11/23/1999	11/15/1999	11/15/1999	11/15/1999
SAMPLE TIME	14:30	15:00	10:30	10:45	10:50
LAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB
LAB NUMBER	99X-05169	99X-05170	99X-04985	99X-04986	99X-04987
TYPE	XRF	XRF	XRF	XRF	XRF
DEPTH	10.5-12.5'	15-17'	0.5-2.5'	2.5-4.5'	4.5-6.5'
SAMPLE NUMBER	IMMS-9910-287	IMMS-9910-288	IMMS-9910-246	IMMS-9910-247	IMMS-9910-248

10-12

15-17

-- METALS &amp; MINOR CONSTITUENTS --

	DH-46	DH-46	DH-47	DH-47	DH-47
ARSENIC (AS) TOT	470.0	153.0	1294.0	4456.0	110.0
CADMIUM (CD) TOT	31.0	< 10.0	298.0	222.0	< 10.0
COPPER (CU) TOT	315.0	88.0	1090.0	1951.0	58.0
IRON (FE) (%) TOT	3.0	3.0	5.0	7.0	3.0
LEAD (PB) TOT	914.0	47.0	5153.0	10372.0	201.0
MANGANESE (MN) TOT	441.0	448.0	555.0	3977.0	595.0
ZINC (ZN) TOT	296.0	123.0	1597.0	15060.0	292.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	DH-45	DH-45	DH-45	DH-45	DH-45	DH-45
SAMPLE DATE	11/10/1999	11/10/1999	11/10/1999	11/12/1999	11/12/1999	11/12/1999
SAMPLE TIME	10:15	11:40	11:45	9:30	10:00	11:40
LAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB
LAB NUMBER	99X-04979	99X-04980	99X-04981	99X-04982	99X-04983	99X-04984
TYPE	XRF	XRF	XRF	XRF	XRF	XRF
DEPTH	0.5-2.0'	3-5'	5-7'	8-10'	10-12'	15-17'
SAMPLE NUMBER	IMMS-9910-240	IMMS-9910-241	IMMS-9910-242	IMMS-9910-243	IMMS-9910-244	IMMS-9910-245
	0-2	2-4	4-6	8-10	10-12	15-17
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	2186.0	1194.0	2517.0	561.0	793.0	472.0
CADMIUM (CD) TOT	355.0	118.0	243.0	138.0	129.0	816.0
COPPER (CU) TOT	4139.0	1062.0	3005.0	399.0	281.0	71.0
IRON (FE) (%) TOT	6.0	4.0	6.0	3.0	3.0	3.0
LEAD (PB) TOT	9224.0	3381.0	7468.0	1282.0	765.0	186.0
MANGANESE (MN) TOT	629.0	504.0	798.0	839.0	457.0	444.0
ZINC (ZN) TOT	5629.0	3674.0	5287.0	928.0	549.0	2790.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.



DRAFT  
ANALYSES SUMMARY REPORT

-- SAMPLE TYPE: SOIL --

SITE CODE	DH-39	DH-39	DH-39	DH-39	DH-39	DH-39
SAMPLE DATE	11/16/1999	11/16/1999	11/16/1999	11/16/1999	11/16/1999	11/16/1999
SAMPLE TIME	15:15	15:30	15:40	16:05	16:15	16:45
LAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB
LAB NUMBER	99X-05000	99X-05001	99X-05002	99X-05003	99X-05004	99X-05005
TYPE	XRF	XRF	XRF	XRF	XRF	XRF
DEPTH	1-3'	3-5'	5-7'	9-11'	11-13'	15-16.5'
SAMPLE NUMBER	IMMS-9910-310	IMMS-9910-311	IMMS-9910-312	IMMS-9910-313	IMMS-9910-314	IMMS-9910-315

## -- METALS &amp; MINOR CONSTITUENTS --

	IMMS-9910-310	IMMS-9910-311	IMMS-9910-312	IMMS-9910-313	IMMS-9910-314	IMMS-9910-315
ARSENIC (AS) TOT	386.0	131.0	13.0	14.0	18.0	12.0
CADMIUM (CD) TOT	426.0	17.0	< 10.0	< 10.0	< 10.0	< 10.0
COPPER (CU) TOT	3487.0	2007.0	32.0	33.0	29.0	38.0
IRON (FE) (%) TOT	11.0	14.0	3.0	2.0	3.0	3.0
LEAD (PB) TOT	1801.0	146.0	33.0	15.0	< 10.0	24.0
MANGANESE (MN) TOT	2940.0	5190.0	1438.0	335.0	611.0	473.0
ZINC (ZN) TOT	10803.0	16578.0	1134.0	62.0	56.0	57.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (PLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	DH-39	DH-39	DH-39	DH-39	DH-39
SAMPLE DATE	11/16/1999	11/17/1999	11/17/1999	11/17/1999	11/17/1999
SAMPLE TIME	17:20	9:00	9:30	9:45	10:00
LAB	EHLAB	EHLAB	EHLAB	EHLAB	EHLAB
LAB NUMBER	99X-05006	99X-05107	99X-05108	99X-05109	99X-05110
REMARKS				DUPLICATE	
TYPE	XRF	XRF	XRF	XRF	XRF
DEPTH	20-21.5'	25-26.5'	30-31.5'	30-31.5'	35-36.5'
SAMPLE NUMBER	IMMS-9910-316	IMMS-9910-317	IMMS-9910-318	IMMS-9910-318D	IMMS-9910-319

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	13.0	14.0	< 10.0	10.0	< 10.0
CADMIUM (CD) TOT	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
COPPER (CU) TOT	66.0	55.0	35.0	34.0	44.0
IRON (FE) (%) TOT	2.0	3.0	2.0	2.0	2.0
LEAD (PB) TOT	25.0	65.0	78.0	72.0	65.0
MANGANESE (MN) TOT	579.0	656.0	953.0	1014.0	263.0
ZINC (ZN) TOT	53.0	86.0	109.0	110.0	91.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

## **APPENDIX B**

### **IRS ENVIRONMENTAL HAZARDOUS MATERIALS ABAITEMENT PLAN**

**HAZARDOUS MATERIALS ABATEMENT PLAN**

**ASBESTOS CONTAINING MATERIALS AND LEAD DUST CLEANING  
ASSOCIATED WITH THE  
ASARCO PHASE 4 BUILDING CLEANING AND DEMOLITION**

**Submitted to:**

**Cleveland Wrecking Company  
628 E. Edna Pl.  
Covina, California 91723**

**Prepared by:**

**Darin Dietz  
IRS Environmental of WA, Inc.  
12415 E. Trent  
Spokane WA. 99216**

**April 16, 2007**

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E	Permits/Notifications
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## **1.0 Introduction**

- 1) IRS Environmental of WA (IRSE) has been contracted by Cleveland Wrecking Company, to abate hazards associated with the asbestos-containing materials (ACMs) that were identified in the structures and lead dust cleaning before selective demolition of the Asarco Lead Smelter Plant, located in East Helena, Montana.
- 2) This work plan describes the methods and procedures IRSE shall utilize to remove the subject ACM and lead dust. Sections 2.0 through 7.0 describe the applicable standards and regulations, site supervision, removal procedures and waste handling, WISHA air monitoring and the laboratory analytical procedures for each building scheduled for ACM abatement and/or lead dust cleaning. Appendix A of this work plan identifies the specific scope of work for each building scheduled for asbestos abatement and/or lead dust cleaning.
- 3) This plan is intended to address removal of ACM and lead dust cleaning from the subject structures.

## **2.0 Asbestos Abatement and Lead Dust Cleaning- Applicable Standards and Guidelines**

---

- 1) Asbestos abatement work under this contract will be performed in accordance with all federal, state, and local laws, regulations, standards, and codes governing asbestos abatement. Before starting work, IRSE will provide proper notification Montana Department of Environmental Quality (DEQ).
- 3) IRSE will comply with all provisions of the Montana Asbestos Work Practices and Procedures Manual adopted and incorporated by the reference in the administrative Rules of Montana, Title 17, Chapter 74 Subchapter 3 as it pertains to safety in employment and the applicable provisions of DEQ General Safety and Health Standards as it pertains to occupational safety and health in the workplace. In addition, IRSE will comply with Title 29 CFR 1910 and 1926. The most recent edition of any regulation, standards, document, or code will be in effect. When conflict among the requirements or with this work plan exists, the more stringent requirement(s) will be applied.

In addition, IRSE will comply with all provisions of the Federal OSHA standards applicable to construction work where employees may be exposed to lead (Title 29 CFR 1910 and 1926.62). The most recent edition of any regulation, standards, document, or code will be in effect. When conflict among these requirements or with this work plan exists, the more stringent requirement(s) will be applied.

- 4) Initial exposure assessments will also be conducted at the beginning of all abatement activities in accordance with Title 29 CFR 1926.1101.



### **3.0 Site Supervision and Certification**

---

- 1) IRSE is a licensed asbestos abatement contractor in the State of Montana. All work will be supervised by Mark Kazemba, a state-certified Asbestos Supervisor and has completed the 40 hour hazwoper training. All supervisors are AHERA trained competent persons.
- 2) Supervisory duties will include, but will not be limited to, controlling site access and implementing proper air sampling protocols, as well as appropriate controls to prevent exposure to ACMs and lead. It is also the competent person's responsibility to ensure adequacy of engineering controls and to exercise the authority to select appropriate control strategies up to and including shutdown of the work if conditions are warranted.
- 3) All workers conducting ACM removal activities will be medically qualified and trained for asbestos work involving respirator usage.
- 4) All workers conducting lead dust cleaning will be medically qualified and trained for lead removal work involving respirator usage.

## **4.0 Site Safety and Health Plan**

### **4.1 General**

- 1) IRSE will be responsible for safety and health at the Asarco Phase 4 Building Cleaning and Demolition Project during anticipated asbestos abatement and lead cleaning activities. This includes, but is not limited to, electrical safety, equipment operation safety, mechanical (tool) safety, fire safety, and personnel protective equipment safety.
- 2) The *IRSE Site Specific Hazard Analysis* plan for the Asarco Phase 4 Building Cleaning and Demolition Project (see Appendix D) was developed to be used in conjunction with this Asbestos and Lead Dust Abatement Work Plan. Information found in this Work Plan, including air sampling, decontamination procedures, and work activities should be used to supplement the information contained in the *IRSE Site Specific Hazard Analysis Plan for the Asarco Phase 4 Building Cleaning and Demolition Project*. (see Appendix D).

### **4.2 Work Site Safety**

- 1) Before initiating asbestos or lead cleaning abatement work, IRSE will set and post emergency procedures in a conspicuous place at each active abatement site. The emergency procedures will include provisions for the following:
  - Evacuation of injured workers
  - Emergency and fire egress routes from all work areas, including local telephone numbers for fire and medical emergency personnel, site of hospital routing maps
  - Copies of applicable insurance certificates
  - Entry logs.
- 2) At a minimum, two IRSE personnel with the proper training and certified in basic first aid and cardiopulmonary resuscitation (FA/CPR) will be at each active work site. A general first aid kit will be maintained in the support area for treating minor medical problems.

#### **4.2.1 Work Area Access**

Removal work areas will be clearly marked with barrier tape or other means to warn personnel of the hazards. Immediately adjacent to the removal work area (regulated work areas) a decontamination area for equipment and personnel will be established. The remainder of the IRSE project area will be designated as the support zone. No special markings or warning labels are required for this area.

#### **4.2.2 Hazard Briefing/Site Safety Operation**

- 1) No person will be allowed on the site during active abatement activities without first being given a site hazard briefing. In general, the briefing will consist of a review of the Work Plan and the tailgate safety meeting. All persons on the site, including visitors, must sign the site-specific tailgate safety meeting form. Tailgate safety meetings shall be held prior to the start of any work activities involving all personnel on site.

#### **4.2.3 Entry Log**

- 1) The IRSE Competent Person shall record the names and times of entry and exit of all personnel who enter the asbestos removal and lead dust cleaning work areas (regulated work area).

#### **4.2.4 Entry Requirements**

- 1) Entry into regulated work areas shall be only by personnel authorized by the State Certified Supervisor, Competent Persons, and Personnel authorized to enter regulated work areas shall be trained and medically evaluated and shall wear the PPE required.
- 2) IRSE will be responsible for the security of the work areas of the building(s) involved in the abatement project and secure all assigned entrances and exits at the end of the work day so as to prevent unauthorized entry.
- 3) The tailgate safety meeting log will be maintained and reflect the name of any and personnel attending.

### **4.3 Worker Protection Requirements**

#### **4.3.1 General**

- 1) Danger signs and tape will be posted and meet the specifications of DEQ and OSHA Construction Standards wherever regulated work areas are created. Signs will be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure.
- 2) Electrical power systems located in active abatement areas are de-energized, shut down and locked out and temporary power and lighting sources (if applies) will be provided to the area. The temporary power will be installed in a manner that is consistent with all applicable electrical code, WISHA, OSHA, and IT requirements for temporary electrical systems (if applies).
- 3) A sufficient quantity of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI 29.2 through 79 (local exhaust ventilation requirements) shall be utilized when needed to provide adequate ventilation, or to provide four air changes per hour inside negative pressure enclosures.

#### **4.3.2 Asbestos Abatement Training**

- 1) Training shall be provided to all employees or agents who may be required to disturb asbestos for abatement and auxiliary purposes and to supervisory personnel who may be involved in planning, execution, design, or inspection of abatement projects. Asbestos abatement workers and supervisors must have successfully completed Washington State approved training courses and have state certification cards on site at all times when working.

Inspection undertaken to determine the presence of additional asbestos will be conducted by MCS Environmental, who are currently EPA Certified Building Inspectors. Project design personnel will also be EPA certified. Worker and supervisory certificates and training documentation are located in Appendix B.

2) Worker training shall provide, at a minimum, information on the following topics:

- The health hazards of asbestos, including the nature of various asbestos-related diseases, routes of exposure, known dose-response relationships, the synergistic relationship between asbestos exposure and cigarette smoking, latency periods for disease and health basis for standards.
- The physical characteristics of asbestos, including fiber size, aerodynamic properties, physical appearance, and uses.
- Employee PPE, including the types and characteristics of respirator classes, limitations of respirators, proper selection, inspection, donning, use, maintenance and storage of respirators, field testing the face-piece-to-face seal (positive and negative pressure fitting tests), qualitative and quantitative fit testing procedures, variations between laboratory and field fit factors, factors that affect respirator fit (e.g., facial hair), selection and use of disposable clothing, use and handling of launderable clothing, nonskid shoes, gloves, eye protection, and hard hats.
- Medical monitoring requirements for workers include required and recommended tests, reasons for medical monitoring, and employee access to records.
- Air monitoring procedures and requirements for workers, including description of equipment and procedures, reasons for monitoring, types of samples, and current standards with recommended changes.
- Work practices for asbestos abatement include proper construction and maintenance of air-tight plastic barriers, job set-up of airlocks, worker decontamination systems and waste transfer airlocks, posting of warning signs, engineering controls, electrical and ventilation system lockout, proper working techniques, waste cleanup and disposal procedures.
- Personal hygiene, including entry and exit procedures for the work area, use of showers and prohibition of eating, drinking, smoking, and chewing in the work area.
- Special safety hazards that may be encountered, including electrical hazards, air contaminants (CO2 wetting agents, encapsulant, and materials from Owner's operation), fire and explosion hazards, scaffold and ladder hazards, slippery surfaces, confined spaces, heat stress, and noise.
- Workshops affording both supervisory personnel and abatement workers the opportunity to see (and experience) the construction of containment barriers and decontamination facilities.

- Supervisory personnel shall, in addition, receive training on contract specifications, liability insurance and bonding, legal considerations related to abatement

establishing respiratory protection medical surveillance programs, EPA, OSHA, and State record-keeping requirements.

- 3) Training must be provided by Washington State approved training providers and must be current, each employee having training certification renewed every 12 months as required by regulation.

#### **4.3.3 Lead Dust Removal Training**

- 1) Training shall be provided to all employees or agents who may be required to disturb Lead Dust, and to supervisory personnel who may be involved in planning, execution, design, or inspection of Lead Dust removal projects.

Lead Dust removal supervisors will have successfully completed the Lead in Construction Training Course and will hold current certification. Lead removal workers will have completed Four Hour Lead Awareness Training for Lead in Construction as required by WISHA and OSHA.

- 2) Worker training shall provide, at a minimum, information on the following topics:

- The Content Lead and Title 29 CFR 1910 and 1926.62
- The specific nature of operations which could result in exposures to lead above the action level
- Training requirements for respirators as required by 296-62 WAC, Part E and 29 CFR 1926.103
- The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females and hazards to the fetus and additional precautions for employees who are pregnant).
- The engineering controls and work practices associated with the employees job assignment including training of employees to follow relevant good work practices described in Appendix B, WAC 296-155-17652 and 29 CFR 1926
- Instructions that chelating agents should not routinely be used to remove lead from the body and should not be used at all except under the direction of a licensed physician
- The employees right of access to records under Part B, chapter 289-62 WAC and 296-800 WAC

#### **4.3.4 Respiratory Protection**

- 1) Each worker involved in abatement shall be instructed in the proper use of respirators.
- 2) A sufficient quantity of respirator filters approved for asbestos and lead work will be available. Respirators and unused filters, if applicable, will be stored at the job site in the changing room to protect them completely. The filters used will be high efficiency particulate air (HEPA).
- 3) Workers must perform a field fit test/inspection of their respirator as specified by the manufacturer.
- 4) No one wearing a beard shall be permitted to don a respirator and enter the work area.
- 5) Additional respirators and training on their donning and use must be available at the work site for authorized visitors who may request to enter the work area.

#### **4.3.4 Other Personal Protective Equipment**

- 1) Personal protective equipment that includes Tyvek or polypropylene coveralls with hoods, hard hats, respirators, and nitrile gloves will be provided in sufficient quantities and adequate sizes for all workers and authorized visitors.
- 2) Protective eyewear and hard hats shall be provided as required for workers and authorized visitors for use outside of the containment area.

#### **4.3.5 Medical Monitoring –Asbestos Abatement**

- 1) Medical monitoring must be provided to any employee that may be exposed to asbestos in excess of background levels during any phase of these abatement projects. The purposes of a medical monitoring program are to determine work relatedness of disease, as well as to ensure fitness for duty, particularly the ability to wear a respirator. The medical monitoring program provides the appropriate setting to share this information. Medical monitoring shall include, at a minimum, the requirements of 29 CFR 1926 and IRSE Medical Compliance Plan.
  - A work/medical history to elicit symptomatology of respiratory disease.
  - A chest x-ray (posterior-anterior, 14 x 13 in.) taken by a certified radiologist technician and evaluated by a certified B-reader.
  - A pulmonary function test, including forced vital capacity (FVC) and forced expiratory volume at one second (FEV1), and FEV1/FVC ration (administered by a NIOSH or American Thoracic Society (ATS) Certified Pulmonary Technician) and interpreted and compared to standardized normalcy by a Board Certified Pulmonary Specialist.

- Employees shall be given the opportunity to be evaluated by a physician to determine their capability to work safely while breathing through the added resistance of a respirator. Examining physicians shall be aware of the nature of respiratory protective devices and their contributions to breathing resistance. They shall also be informed of the specific types of respirators the employees shall be required to wear and the work they will be required to perform, as well as special workplace conditions, such as high temperatures, high humidity, and chemical contaminants to which employees may be exposed.
- Evaluation of groups of workers should take into consideration epidemiologic principles as suggested by the ATS in its statement on the work relatedness of disease adopted in 1982.

#### **4.3.6 Medical Monitoring – Lead Abatement**

- 1) Medical monitoring will be provided to any employee that may be exposed to airborne lead in excess of the action level of  $30 \mu\text{g}^3$  during any phase of the Lead dust cleaning process. The purposes of a medical monitoring program is to provide baseline blood lead levels and to provide ongoing biological monitoring to insure engineering controls are effective, as well as to ensure fitness for duty, particularly the ability to wear a respirator. The medical monitoring program provides the appropriate setting to share this information.

Medical monitoring shall include, at a minimum, the requirements of 29 CFR 1926.62 and WAC 296-155-17629:

- An accurate record for each employee including Name, Social Security Number, and a description of the duties of each employee.
- A copy of the physician's written opinions, including those related to fitness for respirator use
- Results of any airborne exposure monitoring done on or for that employee and provided to the Physician
- Each employee shall be given the opportunity to be evaluated by a physician to determine their capability to work safely while breathing through the added resistance of a respirator. Examining physicians shall be aware of the nature of respiratory protective devices and their contributions to breathing resistance. They shall also be informed of the specific types of respirators the employees shall be required to wear and the work they will be required to perform
- Any employee medical complaints related to exposure to lead
- A copy medical examination results and description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information (to be retained by doctor).
- A copy of the results of biological monitoring.

#### **4.4 Emergency Contingency Plan**

- 1) Site personnel must be prepared to respond and act quickly in the event of an emergency. The following emergency preparedness and response procedures will aid in protecting site workers and the surrounding environment.

##### **4.4.1 General**

- 1) The Site Safety Officer will establish evacuation routes and assembly areas for the abatement site. All personnel entering the work area will be informed of these routes and assembly areas. Evacuation routes, rally points, and the locations of emergency equipment will be included on the site map contained within the work plan prior to the initiation of on-site activities.
- 2) In the case of site evacuation, the following procedures shall be observed:
  - Stop working, secure equipment, and return to the decontamination area for decontamination
  - Exit building
  - Walk to the designated rally point using the evacuation route
  - Notify the on-site IRSE Competent Person, Project Manager and the Environmental Health and Safety representative
  - Remain at the rally point until further information is received
- 3) Personnel should not stand in roads, driveways, or in front of gates, as these locations may be used by emergency and support vehicles entering the site.
- 4) Each site activity will be evaluated for the potential for fire, explosion, chemical release, or other catastrophic events. Unusual events, activities, chemicals, and conditions will be immediately reported to the Competent Person.

##### **4.4.2 Emergency Procedures**

- 1) If an incident (personal or vehicle accident, property damage, or near miss) occurs, the following procedures will be used:
  - The Competent Person will evaluate the incident, assess the need for assistance, and notify the Project Manager.
  - The Competent Person will call for outside assistance as needed.
  - The Competent Person will act as liaison between outside agencies and on-site personnel.



- The Competent Person will take appropriate measures to stabilize the incident scene.
- The IRSE Project Manager will provide technical guidance to the Competent Person as needed and notify the MCS's representative.
- The Competent Person will ensure that any injured employee's supervisor completes an injury report form and forwards the form to the Project Manager or Site Safety Officer.

#### 4.4.3 Safety Signals

- 1) While working on site, the following hand signals will be used for communication when necessary.

##### Hand Signal

Arms crossed over head  
Hand gripping throat  
Both hands around waist  
Wave hands over head  
Thumbs up  
Thumbs down

##### Meaning

Shut off equipment  
Out of air, can't breathe  
Leave area immediately  
Need assistance  
Okay, I am all right, I understand  
No, negative

- 2) Vehicle or portable air horns will be used for alarm signals as follows:

- One long blast: Emergency evacuation of the site
- Two short blasts: Clear working area around powered or moving equipment

#### 4.4.4 Medical Emergency

##### 4.4.4.1 General

- 1) Prior to field work, Site Health and Safety Officer will contact and coordinate with all potential emergency response organizations so that they will be aware of any potential site hazards and can meet training and medical requirements. All employee injuries must be promptly reported to the Competent Person. The Competent Person will:
  - Ensure that the injured employee receives prompt first aid and medical attention.
  - Contact Emergency Services at 911 and state clearly "This is a emergency at the East Helena Asarco Plant" ever medical attention is required to ensure that appropriate services are provided.
  - Complete the appropriate form or forms and submit them to the Project Manager or Site Safety Officer within one business day of an incident. Forms include:
    - Supervisor's Employee Injury Report (to be completed by the employee's supervisor)

- Vehicle Accident Report
- General Liability, Property Damage and Loss Report
- Ensure that the Project Manager and Site Safety Officer are immediately notified of the Incident.
- Initiate an investigation of the incident, with the assistance of a representative prior to restarting work activities.

#### **4.4.4.2 Chemical Inhalation**

- 1) Any employee complaining of symptoms of chemical overexposure will be removed from the work area and transported to the designated medical facility for examination. The Competent Person must contact the Project Manager and Site Safety and Health Officer immediately.

#### **4.4.4.3 Eye Contact**

- 1) Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while on the site shall immediately proceed to the eyewash station. Do not decontaminate before using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Thoroughly flush the eye with clean water. Arrange prompt transport to the designated medical facility.

#### **4.4.4.4 Skin Contact**

- 1) Project personnel who have had skin contact with contaminants will, unless the contact is severe, precede through the decontamination facilities to the wash-up area. Personnel will remove any contaminated clothing, and then wash the affected area with water. The worker should be transported to the medical facility listed below if they show any sign of skin reddening or irritation or if they request a medical examination, MSDS should be made available to medical staff for evaluation, if available.

#### **4.4.4.5 Personal Injury Accident**

- 1) In the event of a personal injury accident, the Competent Person will assess the nature and seriousness of the injury. In the case of serious or life-threatening injuries, normal decontamination procedures may be abbreviated or bypassed. Less serious injuries, such as strains, sprains, minor cuts, and contusions, may only be treated after the employee has been decontaminated.

Following decontamination, an IRSE project team member qualified in FA/CPR will administer suitable first aid. The Competent Person will then, if necessary, arrange transport to the appropriate medical facility. The Project Manager must be notified of all recordable injuries, illnesses, and vehicle accidents. Washington State Department of Labor and Industries must be verbally notified within eight hours of any accident resulting in a fatality, within 24 hours of in-patient hospitalization.

- 2) Because the bites of snakes, spiders, scorpions are rare, the recommended treatment is outlined here as a reminder in case of a bite. DO NOT cut the site of the bite and suck out the venom, but rather lie the victim down and keep the person calm. Try to keep the affected area lower than the heart. Ice may be applied to the area of the bite but make sure that there is no direct skin contact with the ice. Use a towel for insulation to prevent freezing the skin. DO NOT use a tourniquet or constricting band on the affected limb. Get the victim to medical attention.

#### **4.4.4.6 Fire**

- 1) In the case of a fire on the site, the Competent Person will assess the situation and determine the proper response. All personnel NOT trained in the use of fire extinguishers shall evacuate the area involved. Only IRSE personnel trained in the use of extinguishers may attempt to extinguish the fire with available extinguishers if it is safe to do so. If these trained employees do not wish to make the attempt, they are to evacuate also. In the event of ANY fire, IRSE will call the East Helena Fire Department at the number listed in the Site Specific Safety Plan and notify the Site Safety and Health Officer immediately. Fire fighting is a job for the fire department. No property or equipment is so important as to risk an employee's life.

#### **4.5 Failure of Work Area Containment System (where applicable)**

- 1) The work enclosure and negative air system will be closely monitored for failure or a breach. If such an event occurs, the work inside would immediately stop and the problem resolved. A breach in containment could be quickly repaired with duct tape; if the negative air system is the source of problems, the cause of the malfunction will be determined, and the necessary repairs or replacements made so that work can resume.
- 2) Asbestos waste that can be vacuumed will be contained in a HEPA vacuum. The bagged waste from the operation would not create a spill hazard. The asbestos waste inside the HEPA vacuum will be removed inside a containment area built specifically for this purpose.

#### **4.6 Emergency Information**

- 1) Before the start of the project, contact will be made with local authorities and emergency services to establish a communication channel during an event of emergency and to familiarize the project personnel with the communication procedures and services. Pertinent emergency information will be included on the daily tailgate safety meeting forms.
- 2) The Site Specific Safety Plan at Appendix E contains directions to St Peter's Hospital (see also Emergency Phone List attached).

#### 4.6.1 Key Project Personnel

IRSE Project Manager	Carl Burnham	509-927-7867	office
		509-998-8257	mobile
IRSE Competent Person	Mark Kazemba	509-884-4267	mobile
IRSE Health and Safety Officer	Robert Reed	509-927-7867	
CWC Project Manager	_____	_____	office
		_____	mobile
CWC Safety and Health Officer	_____	_____	office
		_____	mobile
Asarco Plant Manager	Blaine Cox	406-227-4098	office
		406-459-8542	cell
Asarco Environmental Manager	Jon Nickel	406-227-4529	office
Department of Environmental Quality		406-444-5300	office
OSHA Regional Office		406-247-7494	office (Billings)
Montana DEQ (NEHEPS)	John Podolinski	406-444-2690	office
		406-444-1499	fax
Occupational Medicine Associates	Dr. Royce Van Gerpin	509-455-5555	office

#### 4.6.2 Medical Care Facilities

Saint Peter's Hospital  
 2475 Broadway  
 Helena, MT 59601  
 (406) 442-2480

#### 4.6.3 Emergency Telephone Numbers

Emergency	<b>911</b> Notify Emergency Crews: Say <i>"This is an emergency at the E Helena Asarco lead smelter"</i>
National Response Center (spills)	800 - 424-8802
Regional Poison Control Center	800 - 525-5042
Fire Department	406-227-5377 (Dispatch) or 911
Police Department	406-227-5377 (Dispatch) or 911

## **5.0 Asbestos and Lead Removal Techniques and Procedures**

- 1) Asbestos-containing materials that will be removed from the site buildings and are judged by a competent person to be friable (i.e., those ACMs that, when dry, can be crushed, crumbled, pulverized, or otherwise rendered to a dust by hand pressure) will be packaged and stored in a manner prescribed herein for disposal as hazardous waste.
- 1) Lead Dust is present within the interiors of structures schedule to be demolished. These structure will be cleaned of the dust before demolition of the structure.
- 2) Lead Dust waste that is collected during cleaning of the structures will be packaged and stored in a manner prescribed herein for disposal as hazardous waste.

### **5.1 Notifications**

- 1) IRSE will make required notifications to the Department of Environmental Quality and submit these notifications to CWC before beginning work.

### **5.2 Work Area Preparation**

#### **5.2.1 Warning Signs – Asbestos Abatement**

- 2) Danger signs meeting the specifications of OSHA Construction Safety Order, Section 1529 and WAC 296-62-077 will be posted at any location and approach where regulated areas are present. Signs will be posted at a distance sufficiently far enough away from the work areas to permit any employee or visitor to read the sign and take the necessary protective measures to avoid exposure. Warning signs shall include the following wording:

**DANGER  
ASBESTOS  
CANCER AND LUNG DISEASE HAZARD  
AUTHORIZED PERSONNEL ONLY  
RESPIRATORS AND PROTECTIVE CLOTHING  
ARE REQUIRED IN THIS AREA**

- 2) These warning signs shall be printed in letters of sufficient size to be clearly legible.

#### **5.2.2 Warning Signs- Lead Dust Abatement**

- 3) Entrance by non- trained personnel into the lead paint removal area will be restricted using 3" barrier tape posted at the work area perimeter. Warning tape shall include the following wording:

**Danger Lead Removal  
Authorized Personnel Only**

- 2) The warning tape shall be printed with letters of sufficient size to be clearly legible.

### **5.2.3 Electrical Power**

- 1) The contractor will provide adequate power at each of the buildings. IRSE will provide temporary lighting sources and ensure safe installations (including ground faulting) of temporary power sources and equipment by complying with all applicable electrical code requirements and OSHA requirements for temporary electrical systems, within each building, as applies.

### **5.2.4 Establishing Asbestos Removal Work Areas**

- 1) During indoor Class I removal of thermal system insulation, the wrap and cut method will be utilized. (HEPA) vacuums and wet methods will be utilized.
- 2) As applicable, IRSE will seal the exterior of the regulated areas. All windows, doors, and any other openings to the outside of the building from the regulated areas, will be sealed with a minimum of one layer of 6-mil poly sheeting with duct tape, until a negative exposure assessment is conducted.
- 3) During Class I removal of TSI using glovebag and wrap and cut methods with HEPA vacuum method procedures, the work area will be restricted using signs as described in 5.2.1. 6-mil poly will be installed on floors/ground in work area. Negative air machines may be installed in order to provide clean air from outside the work area at sufficient quantities and at strategic locations, so as to provide clean air in the workers' breathing zone, as described in Appendix D IRSE Hazardous Material Contractor Quality Control Plan.
- 4) During outdoor Class II removal of transite shingles and skirting, a single layer of 6-mil poly will be placed on the ground directly under the material to be removed, extending 10-20' out from the base of the building.
- 5) During outdoor Class II removal of metal siding, a single layer of 6-mil poly will be placed on the ground directly under the material to be removed, extending 10-20' out from the base of the building.
- 6) During Class II removal of floor covering, the work area will be restricted using signs as described in 5.2.1. 6-mil poly will be installed critical in the work area. Negative air machines will be installed in order to provide clean air from outside the work area at sufficient quantities and at strategic locations, so as to provide clean air in the workers' breathing zone, as described in Appendix D IRSE Hazardous Material Contractor Quality Control Plan.
- 7) During Class II removal of asbestos-containing roofing materials a single layer of 6-mil poly will be placed on the ground directly under the material to be removed, extending 10-20' out from the base of the building.
- 8) During Class II removal of window caulking, a single layer of 6-mil poly will be placed on the ground directly under the material to be removed, extending 5-10' out from the base of the building.

- 8) During removal of all Class II work, the area will be restricted using signs described in 5.2.1. Specific means and methods will be found in Appendix D.
- 6) 2" red "DANGER ASBESTOS - DO NOT ENTER" tape will be used to restrict access by untrained personnel.

#### **5.2.5 Establishing Lead Dust Removal Work Areas**

- 1) As applicable, IRSE will seal the exterior of the regulated areas. All windows, doors, and any other openings to the outside of the building from the regulated areas, will be sealed with a minimum of one layer of 6-mil poly sheeting with duct tape, until a negative exposure assessment is conducted.
- 2) 2" red "DANGER LEAD - DO NOT ENTER" tape will be used to restrict access by untrained personnel.

#### **5.3 Workplace Entry and Exit Procedures – Asbestos and LEAD**

- 1) IRSE will be using mobile trailer designed as a 3-stage worker decontamination unit, and a fixed worker decontamination unit (2- or 3-stage, depending on the scope of work at each individual work site) and locate it next to the entrance of the work area.
- 2) If the quantity of thermal system insulation exceeds 10 linear feet or 25 square feet, IRSE will construct a three-stage decontamination unit, including clean room, shower and dirty room, contiguous to the "regulated work area". If the quantity of ACM to be abated is less than 10 linear feet or 25 square feet, IRSE will construct a two-stage decontamination unit, including clean room and dirty room, contiguous to the "regulated work area". The procedures that will be used to enter decontamination units are described below.
- 3) Workers will enter the regulated work areas through the worker decontamination unit. The decontamination unit is a fully enclosed system.
- 4) These decontamination units will include an equipment or "dirty" room, a functional shower equipped with hot and cold running water (if necessary), and a changing or "clean" room in series. The decontamination units will also be constructed in such a manner as to provide a systematic reduction of contamination for the workers and equipment exiting the regulated work area. Personnel entry into and egress from the regulated work areas will be through the decontamination units. Equipment and material replenishment may also be conducted through the decontamination unit.
- 5) Wastewater resulting from the operation of the shower units shall be filtered with a 5-micron pore-size filtration system before reuse or discharge. To the extent feasible, filtered wastewater will be reclaimed and used on site for application in wet method work practices. Wastewater to be discharged shall be sufficiently filtered to meet state and local water quality objectives before discharge. Filters shall be changed as necessary to achieve this objective.

- 6) Before exiting the work area, personnel shall remove outer protective clothing and use a HEPA vacuum to remove ACM debris from protective clothing. Workers shall then proceed to move disposable clothing and dispose of it as hazardous waste. Non-disposable clothing (such as work boots) shall be decontaminated before being removed from the work area.

\*\*Removing asbestos dust from protective clothing or equipment by blowing, shaking, or any other means that disperses asbestos fibers into the air shall likewise be prohibited.

- 6) If applicable, workers exiting the regulated work areas will wash (shower) all areas of the body that were potentially exposed to asbestos contamination. Respirators shall continue to be worn by workers until the worker has entered the shower and begun to wash. Once the head has been deluged with water, the respirator may be removed. IRSE will supply workers with soap and shampoo to use in the showers.
- 7) A secure change room shall be provided outside the decontamination units and shall be equipped with storage for workers' street clothes and personal belongings. Workers are to change from street clothes each day before entering the regulated work area. Workers are to change back into street clothes each day before leaving the work site. Personnel are prohibited from wearing potentially contaminated clothing off the site. Housekeeping within the change room will be maintained by IRSE. Periodic area air monitoring will be conducted to evaluate housekeeping efforts.
- 8) Waste containers shall also be decontaminated using HEPA vacuums and by wet wiping before being removed from the work areas.
- 9) In the event an emergency egress from within the regulated work is required, the above-described personnel decontamination procedures will not be required. IRSE will exercise judgment to ensure that worker health and safety is placed above environmental contamination concerns.
- 10) In those instances when it is not feasible to provide shower facilities contiguous with the work area or where the work is performed outdoors, the Contractor shall ensure that employees remove (1) asbestos contamination from their worksuits in the equipment room utilizing a HEPA vacuum before proceeding to a shower that is not adjacent to the work area, or (2) their contaminated worksuits in the equipment room, don a clean worksuit, and proceed to a shower that is not adjacent to the work area. A second inner disposable/breathable Tyvek whole-body coverall may be utilized by workers for modesty's sake under the primary outer worksuit. The outer suit will be cleaned using a HEPA vacuum and removed within the isolated work area.
- 11) The containment design and decontamination unit that will be utilized for each work area will be dependent on the DEQ asbestos work classification.



## **5.4 Personal Protective Equipment**

- 1) Except when more stringent requirements are set forth, the personal protective equipment (PPE) utilized during the conduct of this work must meet or exceed the requirements contained in Title 29 CFR 1926.1101.

### **5.4.1 Respiratory Protection**

- 1) Half-face negative pressure respirators (equipped with HEPA filters) will be utilized for Class I and II materials being removed on this project. Protective glasses or goggles worn by workers will conform to the specifications of the ANSI Z87.1 standard of Title 29 CFR §1910.133.
- 2) Half-face negative pressure respirators (equipped with HEPA filters) will be worn by all personnel working within Lead Dust Removal Work Areas.
- 3) Once a negative pressure enclosure (if applies) has been visually inspected and placed under a negative air pressure differential, full-faced supplied air respirators operated in constant flow or pressure demand mode and equipped with HEPA escape filters, will be worn by workers, supervisors, work monitors, industrial hygienists, and other entering the regulated work area.
- 3) During outdoor Class II removal of materials, half-face negative pressure respirators equipped with HEPA filters will be used.
- 4) During indoor Class II removal of all materials identified, half-face negative pressure respirators equipped with HEPA filters will be used.
- 5) All respirators shall be used in a manner consistent with state-of-the-industry practices. The respirators shall be worn with head straps in direct contact with the head and shall not be worn on the outside of the hoods of disposable whole-body coveralls. An exception to this is allowable in those instances when a remote decontamination unit is being utilized and the worker is double suited. Respirators shall be worn until proper personal decontamination methods, as described herein, are completed.
- 6) The Contractor will provide respirators in accordance OSHA 1019.133 Respirator Protection

### **5.4.2 Whole Body Protection**

- 1) Work boots with nonskid soles or impermeable work-boot covers shall be worn by workers. Protective footwear worn by workers shall conform to the specifications of the ASNI Z41.1 standard. Work boots that have come into contact with contaminated material shall be cleaned, decontaminated, and bagged before removal from the work area.
- 2) Protective head gear (hard hats) shall be worn at all times that work is in progress. Protective head gear worn by workers shall conform to the specifications of the ANSI Z89.1 (Class A) standard. Hard hats shall be thoroughly decontaminated before removing from the work area.

- 3) In work areas where excessive noise is prevalent, worker shall wear hearing protection sufficient to ensure that the worker's 8-hour time-weighted average (TWA) exposure does not exceed 85 Dba.
- 4) IRSE will make available extra sets of PPE to be used by the owners authorized representative for use to enter the regulated work areas.

## **5.5 Asbestos Removal Techniques and Procedures**

- 1) For the purposes of this work plan, the removal of ACM thermal system insulation (TSI) or ACM surfacing materials will be considered "Class I Asbestos Work," as defined by OSHA 1915.1001 and Title 29 CFR 1926.1101 and shall be conducted in accordance with work practices and requirements set forth for Class I work.
- 2) IRSE will conduct the construction activities described herein in accordance with all currently applicable federal, state, and local laws and regulations including, but not limited to, Title 29 CFR 1926.1101.
- 3) All asbestos-containing material thermal system insulation will be removed via the glovebag method or glovebag and wrap and cut method, with negative air ventilation procedures.

### **5.5.1 Removal of ACM Thermal System Insulation from Buildings**

- 5) IRSE will then pre-clean the work area. This will entail cleaning of any visible asbestos debris and dirt which may affect area and clearance air monitoring. Following pre-cleaning, IRSE will begin installing glovebags on the pipes which have been determined to contain asbestos-containing thermal system insulation.
- 6) The IRSE Competent Person will then conduct visual inspections and smoke testing on the glovebags and ensure that all necessary tools are present, including Hudson sprayers, waste bags, and a HEPA vacuum.
- 7) Only after satisfactory visual inspections from the IRSE Competent Person will the go ahead to begin asbestos removal be given.
- 8) All glovebagging will be conducted in two-man crews. One worker will remove the asbestos-containing pipe insulation inside the glovebag while the other worker constantly mists the insulation with amended water.
- 9) Once the ACM insulation has been removed from the pipe and is on the bottom of the glovebag, the pipe and top inside portion of the glovebag will be wet wiped clean. IRSE will twist the bag several times and tape it to keep the ACM in the bottom during removal of the glovebag from the pipe. A HEPA vacuum should be used to evacuate air out of the glovebag.
- 10) A 6-mil disposal bag will be slipped over the glovebag (while still attached to the pipe). The tape holding glovebag to pipe will then be removed and the top of glovebag opened then folded down into waste bag.

- 11) Following an acceptable visual inspection from the CWC Site Safety Officer, IRSE will apply an encapsulant to all surfaces in the work area and clearance sampling can be collected for analysis.

#### **5.5.2 Outdoor Removal of Transite Shingles and Metal Siding**

- 1) The workers will don appropriate PPE as described in Section 5.4.
- 2) IRSE will perform setup of the work area as described in Section 5.2.3(3).
- 3) IRSE will notify the on-site Safety Officer prior to beginning removal so that visual inspections can be conducted to insure that all necessary tools are available, including water, HEPA vacuum, lined dumpster.
- 4) After satisfactory visual inspection by the Safety Officer, IRSE will begin transite removal.
- 5) Transite removal will be conducted using methods described in the IRSE Hazardous Material Contractor Quality Control Plan.

#### **5.5.3 Removal of all other Class II Materials**

- 1) The workers will don appropriate PPE as described in Section 5.4.
- 2) IRSE will perform setup of the work area as described in Section 5.2.3(7).
- 3) IRSE will notify the on-site Safety Officer prior to beginning removal so that visual inspections can be conducted to insure that all necessary tools are available, including water, HEPA vacuum, lined dumpster.
- 4) After satisfactory visual inspection by the Safety Officer, IRSE will begin removal of specific materials, as identified in Appendix D.
- 5) Class II removal will be conducted using methods described in the IRSE Hazardous Material Contractor Quality Control Plan.

#### **5.5.4 Final Visual Inspection of Work Area**

- 1) Following an acceptable visual inspection by the CWC Site Safety Officer after asbestos removal from each asbestos removal work area, IRSE will apply an encapsulant to all surfaces in the work area and clearance sampling can be collected for analysis.
- 2) All abated areas will be inspected by the Contractor, CWC Onsite Supervisor and IRSE supervisor. Upon successful inspection, each will sign the completed form "Final Inspection Report" Form. The Form can be found at the end of Attachment C: Forms.

## **5.6 Removal of Lead Dust from Buildings**

- 1) IRSE will conduct the construction activities described herein in accordance with all currently applicable federal, state, and local laws and regulations including, but not limited to, Title 29 CFR 1019.10025.

### **5.6.1 Vacuuming Lead dust in Building**

- 1) The workers will don appropriate PPE as stated in Section 5.4 and IRSE Hazardous Material Quality Control Plan.
- 2) IRSE will then perform setup of the "Lead Removal Work Area" as stated in Section 5.2.4. (1), including installing critical barriers.
- 3) IRSE will also install a two stage decontamination unit as stated in Section 5.3. The decontamination unit will be placed at the doorway leading into the building or at a central area on site.
- 4) Once the decontamination unit and all critical seals have been installed, the IRSE Competent Person will perform a visual inspection of the work area to ensure that all critical seals are in place and that adequate negative pressure has been established, if applies.
- 4) All abated areas will be inspected by the Contractor, CWC Onsite Supervisor and IRSE supervisor. Upon successful inspection, each will sign the completed form "*Final Inspection Report*" Form. The Form can be found at the end of Attachment C: Forms.

## **6.0 Waste Handling and Disposal**

### **6.1 Packaging and Storage of Waste and Removal from the Work Area**

- 1) The friable ACMs that will be removed from the project site and are judged by a competent person to be friable (i.e., those ACMs that, when dry, can be crushed, crumbled, pulverized, or otherwise rendered to a dust by hand pressure) will be packaged and stored in a manner prescribed herein for disposal as hazardous waste.
- 2) Friable asbestos waste shall be placed in two layers of 6-mil polyethylene disposal bags.
- 3) All friable asbestos waste (bagged) will exit the work area through the equipment room of the decontamination unit or from a separate waste load out decontamination unit. These waste load out units will be contiguous to the work area containment.
- 4) The personnel loading the asbestos-containing waste will be protected by disposable clothing and, at a minimum, half-facepiece air-purifying dual-cartridge respirators equipped with high efficiency filters.
- 5) The bagged or wrapped asbestos waste shall be properly labeled and placed in locked storage containers. At a minimum, the outside of each waste bag or package containing asbestos hazardous waste will be labeled as described in 6.2(5).

### **6.2 Packaging and Storage of Nonfriable Waste and Removal from the Work Area**

- 1) The nonfriable ACMs that will be removed from the project site and are judged by a competent person to be nonfriable (i.e., those ACMs that, when dry, cannot be crushed, crumbled, pulverized, or otherwise rendered to a dust by hand pressure) will be packaged and stored in a manner prescribed herein for disposal as hazardous waste.
- 2) Nonfriable asbestos waste will be loaded directly into a mega boxes, (Gaylord boxes) place in disposal bags and doubled bagged or double wrapped with 6 mil poly.
- 3) The personnel loading the asbestos-containing waste will be protected by disposable clothing and, at a minimum, half-facepiece air-purifying dual-cartridge respirators equipped with high efficiency filters.
- 5) The wrapped asbestos waste shall be properly labeled and placed in locked storage containers. At a minimum, the outside of each package containing asbestos hazardous waste will be labeled as follows:

**DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD  
HAZARDOUS WASTE  
STATE AND FEDERAL LAW  
PROHIBITS IMPROPER DISPOSAL  
IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY  
AUTHORITY OF THE WASHINGTON DEPARTMENT OF  
TOXIC SUBSTANCES CONTROL**

Generator's Name \_\_\_\_\_

Address \_\_\_\_\_

Manifest \_\_\_\_\_

RQ, Asbestos, 9, NA2212, III

- 6) The asbestos disposal containers (e.g., bags, wraps and boxes) and storage areas shall be secured and placarded with appropriate warning signage

### **6.3 Transportation and Disposal**

- 1) The disposal of waste that contains asbestos waste and lead waste will stay onsite and be placed in a storage area designated by the General Contractor.

## **7.0 Air Monitoring Sampling**

### **7.1 Personal Air Monitoring – Asbestos**

- 1) IRSE's Competent Person will be conducting personal air monitoring on workers involved in the project. Personal air monitoring for asbestos will be conducted in accordance with Title 29 CFR 1926.1101. The IRSE Competent Person shall use the personal air monitoring results to evaluate the effectiveness of engineering controls and the adequacy of PPE and to determine whether the appropriate work practices are being utilized.
- 2) Personal exposure monitoring for asbestos shall be conducted utilizing single-use standard 25-mm-diameter, 0.8 -micron pore size, MCE membrane filters and cassettes with nonconductive cowlings ("barrels") and shrink bands. Air samples for asbestos concentrations will be analyzed by PCM Method 7400/7402.
- 3) The Contractor's workers shall not be exposed to an airborne fiber concentration in excess of 1.0 fiber per cubic centimeter (f/cc) as averaged over a sampling period of 30 minutes nor in excess of 0.1f/cc as expressed as an 8-hour TWA.
- 4) The Contractor will post the results of daily personal air monitoring at the job site.

### **7.2 Pre-abatement, Area and Perimeter Sampling – Asbestos**

- 1) Except as otherwise noted, environmental sampling for airborne asbestos shall be conducted utilizing single-use, standard 25-millimeter-diameter, 0.8-micron pore size, mixed MCE membrane filters and cassettes with nonconductive cowlings ("barrels") and shrink bands. Air samples for asbestos concentrations will be analyzed by PM Method 7400.
- 2) IRSE Competent Person shall conduct daily environmental air sampling for airborne fiber concentrations outside the regulated asbestos work areas. A minimum of two samples will be collected outside each Class I negative pressure enclosure abatement activities.
- 3) Pre-abatement (baseline or background) air sampling will also be conducted by IRSE's supervisor. These samples will be collected in general accordance with 29 CFR 1926.1101, although the number of samples collected per location will vary. Air samples for baseline asbestos fiber concentrations will be analyzed by PCM Method 7400. Pre-abatement air samples will be collected by "nonaggressive" methods.

### **7.3 Final Cleaning, Clearance Sampling Methodology and Analysis – Asbestos**

- 1) Visual inspections and air clearance sampling of each work area shall be conducted by an independent contractor hired by the owner/general contractor. Following the completion of asbestos abatement and final detail cleaning in each work area. The cleaning phase will include misting the air with amended water to reduce airborne fiber concentrations. The cleaning process shall also include vacuuming with HEPA-equipped vacuums and wet wiping. Horizontal surfaces within the area shall be cleaned of all visible asbestos debris using a HEPA vacuum and wet wiped.

If a visual inspection reveals residual three-dimensional debris, IRSE will abate the debris, detail clean the area of the debris, and repeat the HEPA vacuum and wet wiping process.

Once the redeaning process is complete, the work area shall be subject to another *visual inspection for the presence of residual three-dimensional debris*.

- 2) Satisfactory completion of this visual inspection will be followed by the encapsulation of the substrates and/or systems from which the ACM was removed. Following a suitable period of time to allow the encapsulant to dry, final air clearance samples will be collected. Clearance air samples will be collected using the methods described herein. Negative pressure equipment (NPE), if applicable, will continue in operation until satisfactory clearance air sample results are achieved. Failure to achieve satisfactory air clearance results will result in IRSE repeating the final cleaning process and the subsequent collection of additional clearance air samples.
- 3) Collection and analysis of clearance air sample monitoring for asbestos hazard abatement will be an independent industrial hygiene provider under contract with the owner/general contractor. Collection and analysis of clearance work areas after the ACM hazard has been abated and the work area has passed a visual clearance
- 4) Five or more samples will be collected within each containment. Clearance air samples indicating airborne fiber concentrations within the requirements of AHERA Guidelines for asbestos response action activities in schools will be received, and written permission from Northern Industrial Hygiene will be obtained before releasing IRSE to demobilize the work area.
- 5) Once a work area has been abated of ACM hazards, satisfactory final air clearance testing has been concluded and written permission from Northern Industrial Hygiene has been obtained, any remaining layers of polyethylene sheeting shall be removed and disposed of as asbestos waste

#### **7.4 Personnel Air Monitoring – Lead**

- 1) IRSE's Competent Person Supervisor will be conducting personal air monitoring on workers involved in the project. Personal air monitoring for lead will be conducted in accordance with Title 29 CFR 1926.62. The IRSE Supervisor shall use the personal air monitoring results to evaluate the effectiveness of engineering controls and the adequacy of PPE and to determine whether the appropriate work practices are being utilized. 2) Personal exposure monitoring for lead shall be conducted utilizing single-use standard 37-mm-diameter, 0.8 -micron pore size, MCEF membrane filters and cassettes with nonconductive cowlings ("barrels").
- 3) The Contractor's workers shall not be exposed to airborne lead in concentrations over  $15 \mu\text{g}/\text{m}^3$  (half of the action level) as expressed as an 8-hour TWA. If airborne concentrations of lead in the breathing zone of any individual employee reaches  $10 \mu\text{g}/\text{m}^3$ , work will stop and the Northern Management Services Project Manager will be notified. Engineering controls will be re-evaluated and additional engineering controls will be implemented before work resumes.



- 4) The Contractor will post the results of daily personal air monitoring at the job site within 72 hours of air sample collection.

#### **7.5 Area and Perimeter Sampling - Lead**

- 1) The IRSE Supervisor shall use the personal air monitoring results to evaluate the effectiveness of engineering controls and the adequacy of PPE and to determine whether the appropriate work practices are being utilized.
- 2) Monitoring for lead shall be conducted utilizing single-use standard 37-mm-diameter, 0.8-micron pore size, MCEF membrane filters and cassettes with nonconductive cowlings ("barrels").
- 4) IRSE's Supervisor will collect air samples prior (baseline or background) to LBP removal. These samples will be collected for information and documentation only, and are not required by contract documents or regulation.

## **8.0 Laboratory Analysis of Personal Air Samples**

- 1) All personal and OWA air samples will be analyzed at Mountain Labs, Inc.. This lab is an American Industrial Hygiene Association (AIHA) and an EPA National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.
- 2) All air samples for asbestos concentration will be analyzed by PCM Method 7400/7402.

## **Appendices**

- A Supervisor Qualifications**
- B Site Specific Hazard Analysis**
- C ACM Removal Procedures**
- D Fall Protection Plan**
- E Permits/Notifications**
- F Material and Equipment Data**
- G Air Monitoring Plan/Sample Results**
- H Respirator Protection Program/Medical Clearance Documentation**
- I Drawings/Site Layout**
- J Laboratory Certifications**
- K Material Safety Data Sheet**

**Appendix A**  
**Supervisor Qualifications**

**MARK KAZEMBA**  
**Supervisor**

**FIRM AFFILIATION**— Mark is a full time employee at IRS Environmental

**YEARS OF RELEVANT EXPERIENCE**— 20 years in asbestos abatement field.

<b>ACTIVE REGISTRATIONS</b>	<b>ACTIVE REGISTRATIONS (CONTINUED)</b>
AHERA-Certified Asbestos Supervisor	Professional
EPA-Certified Asbestos Supervisor	HAZMAT Certified – 40 hour
Crane and Rigging	CPR / First Aid
Cutting and Welding safety certified.	

**SPECIFIC QUALIFICATIONS,**

Mr. Kazemba has been employed by IRS Environmental since 2005. His relevant project experience since 1987 includes hazardous materials abatement projects supervised at University of Washington, University of Idaho, and University of Montana. These hazard control activities include asbestos and lead painted building component removal, handling of PCB containing lighting ballasts, mercury lamps, and universal hazardous wastes. Mark Also has five years of home building experience prior to his asbestos abatement career.

**RELEVANT PROJECT EXPERIENCE**

Mr. Kazemba experiences in specific evaluation criteria are shown in the table below. The project descriptions that follow are descriptions of projects requiring skills that are relevant to this project.

✓	Asbestos abatement	✓	Demolition	✓	Residential abatement
✓	Asbestos abatement in occupied commercial or public industry buildings, including college campus. Work experience includes University of Washington, University of Idaho, and university of Montana.	✓	Management and or Supervision of three asbestos abatement projects over \$ 300,000.00	✓	Dismantling of Lighting Fixtures Including Handling, Storage and Disposal of Universal and Hazardous Wastes.
✓	Commercial/Industrial abatement		Cost tracking		Test pit/trench excavation
✓	Equipment decontamination	✓	Field documentation		<b>WASTE MANAGEMENT (CONCOVER, COMPACTION, Waste treatment, transport, and/or management</b>
✓	Excavation		Instrument installation		
✓	Decontamination or waste mgmt of contaminated tangible property	✓	Lead-based paint abatement		
			Monitoring well installation		
✓	Debris removal	✓	Public relations		UST removal, closure, replacement

**University of Idaho**—On site supervisor for project involving abatement of thermal system insulation, vinyl asbestos floor tile, spray applied fireproofing, lead related demolition work, PCB Light Ballast Handling, and Lab Sinks.

**Fairchild Air Force Base** — On site supervisor during selective demolition activities and asbestos removal activities.

**The Postal Annex-** On site supervisor during removal of PCB Ballasts, 190,000 SF vinyl asbestos floor tile and asbestos mastic, 120,000 SF of asbestos containing brownscoat ceiling texture and 1,000 LF of asbestos thermal system insulation.

**Libby Soil Remediation** - On site supervisor during clean up of vermiculite contaminated soil project. Removed and replaced 6-10 Inches of soil on multiple residential sites.

**Kaiser Aluminum** — On site supervisor during removal of thermal system insulation and fire proofing insulation in the soaking pits and batch ovens. Selective demolition of refractory walls and floors to access asbestos materials. Cleaned and abated batch ovens and removed thermal insulation from piping using glove bag procedures.

**Asarco Plant, Helena, MT** - On Site Supervisor during heavy metal dust contamination clean up and removal of 170,000 SF of Galbestos siding, 80,000 SF of Transite siding and roofing panels and 2,000 SF of vinyl asbestos tile and associated mastic.



J Tech, Inc.  
Industrial Hygiene Services

## CERTIFICATE OF TRAINING

THIS IS TO CERTIFY THAT

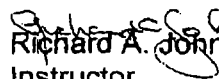
**MARK KAZEMBA, XXX-XX-8319**

**HAS COMPLETED 8 HOURS OF REFRESHER TRAINING IN  
HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE**

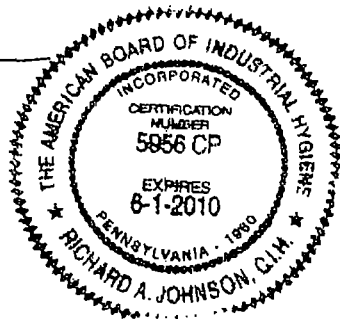
**ACCORDING TO THE REQUIREMENTS OF 29 CFR 1910.120  
AND CHAPTER 296-843-20010, WASHINGTON ADMINISTRATIVE CODE**

Training Period 3 March 2007

Expiration Date 3 March 2008

  
Richard A. Johnson, CIH  
Instructor

Certificate Number 7-0010.18-11





Paula A. Lantsberger, MD MPH  
Terrence D. Rempel, MD  
Royce F. Van Gerpen, MD

57,503

A500423

MARK C. KAZEMBA

003 CSH

04/12/06

06/02/60 45 M

323 East Second Avenue  
Spokane, WA 99202

IKS ENV

REMPER, TERRENCE D

Occupational Medicine  
Associates

509.455.5555  
509.455.4114 FAX

-#318

## ASBESTOS CLEARANCE

Name: Mark Kazemba

Date Examined: 4-12-06

Results: There are no detected health conditions that would place this employee at an increased risk of material health impairment from exposure to asbestos:

☒ Yes ☐ No

Limitations: Recommended restrictions on this employee or upon the use of personal protective equipment: None

Physician's statements: I have informed this employee of the results of the medical exam and of any medical conditions resulting from asbestos exposure that require further explanation or treatment.

☒ I have also informed this employee of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

Physician signature: Terrence D. Rempel  
Physician signature: Lantsberger, Rempel, Van Gerpen

Examinations: Height: 73 Weight: 201 B/P: 122/80 Pulse: 68

	Normal	Abnormal	
Ears:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	TM's intact
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Canals clear
Mouth:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Clear / no obstruction
Neck:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Supple / no masses
Lungs:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Clear A + P
Heart:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Regular Rate / no murmur
Abdomen:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No mass / no organomegally
Lymphatics:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No lymphadenopathy

Asb + 1 eq.

PFTs: ☐ Normal ☐ Abnormal ☐ Unacceptable ☐ No change

CXR: ☒ Normal ☐ Abnormal ☐ Unacceptable ☒ No change





WASHINGTON-OREGON-IDAHO-MONTANA  
E. 12415 TRENT AVE.\*SPOKANE,WA 99216  
(509) 927-7867 FAX 928-3933

ASBESTOS\*LEAD  
ENVIRONMENTAL  
SERVICES

**IRS ENVIRONMENTAL OF WA, INC.**  
**CERTIFICATION OF WORKER'S ACKNOWLEDGMENT**

\*\*\* WORKING WITH ASBESTOS CAN BE DANGEROUS  
\*\*\* INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPE OF CANCER  
\*\*\* IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS\*  
GREATER THAN THAT OF THE NON-SMOKING PUBLIC

IRS ENVIRONMENTAL requires that:

- \* You be supplied with the proper respirator and be trained in its use.
- \* You be trained in safe work practices and in the use of the equipment found on the job.
- \* You receive a medical examination.

These things have been done at no cost to you. By signing this certification you are acknowledging the fact that IRS Environmental (your employer) has met these obligations to you.

**RESPIRATORY PROTECTION:** I have been trained in the proper use of respirators, and informed of the type of respirator to be used on IRS Environmental asbestos and lead removal projects. I have a copy of the written respiratory protection manual issued by my employer. I have been equipped at no cost with the respirator to be used on this project.

**TRAINING COURSE:** I have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. The topics covered in the course include the following:

Physical characteristics of asbestos  
Health hazards associated with asbestos  
Respiratory protection  
Use of protective equipment  
Negative air systems  
Work practices including hands on or on-job training  
Personal decontamination procedures  
Air monitoring, personal and area

+

This certifies that  
Mark Kazemba  
has completed the Responder I  
Course for First Aid and CPR

Course Date 3-2-06  
Expiration Date 3-2-08  
Instructor Mark Kazemba

**MEDICAL EXAMINATION:** I have had a medical examination within the past 12 months, which was paid for by IRS Environmental or my previous employer. This examination included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

Mark Kazemba  
Employee Signature

4-22-05  
Date

CERTIFIED AS PROVIDED BY LAW AS

ASBESTOS SUPERVISOR  
CERTIFICATE NUMBER: 2007008081A  
EXPIRATION DATE: 09/16/2007

KAZEMBA, MARK C  
E 24714 SAN CARLOS  
NEWMAN LAKE, WA 99025

Signature Mark Kazemba  
Issued by DEPARTMENT OF LABOR AND INDUSTRIES

MARK C KAZEMBA		
has met the requirements of Title 17, Chapter 74.3, Subchapter 3, of the Administrative Rules of Montana for accreditation in the following asbestos-type occupation(s) as indicated by an expiration date(s).		
CS	MTA-2317	IN
09/16/2007	MR	
WK	<u>Mark Kazemba</u>	
MT DEQ Asbestos Control Program		



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ENVIRONMENTAL  
SERVICES

### QUALITATIVE FIT TEST RECORD

Name: Mark Kazemba

Issue Date: 2-27-07

Soc. Sec. No.: 471-84-8319

Expiration Date: 2-27-08

Test Operator: Jack Wirth

TYPE OF QUALITATIVE FIT TEST: IRRITANT SMOKE

#### RESPIRATOR

Respirator brand: North

NIOSH Approval #: TC-21C-152

Model: 7700

Wear at least 10 minutes: 1/2 S

Size: Small \_\_\_\_\_  
Med. ✓  
Lrg. \_\_\_\_\_

+/- Pressure fit check: PASS

#### TEST

Each exercise is performed for one minute

Normal Breathing-No talking

Deep breathing-be certain breaths are deep

Turn head side to side-Inhale on each side, do not bump  
the respirator against shoulders

Move head up and down-Inhale when head is in full up position,  
do not bump respirator against chest

Reading-with eyes closed, repeat slowly and clearly after the  
conductor the "Rainbow Passage"

Jogging in place-Jog in place

Normal breathing-No talking

Pass	Fail
<u>✓</u>	_____
<u>✓</u>	_____
<u>✓</u>	_____
<u>✓</u>	_____
<u>✓</u>	_____
<u>✓</u>	_____
<u>✓</u>	_____

FINAL FIT: PASS

Supervisor Signature: Jack Wirth

Employee Signature: Mark Kazemba

\*\* Employee must have a current qualitative fit test before assigning them a task that requires a respirator to be worn.



CONT. REG. NO. IRSENW1033PN

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**ASBESTOS\*LEAD  
ENVIRONMENTAL  
SERVICES**

## **QUANTITATIVE FIT TEST RECORD**



**J TECH**  
**Industrial Hygiene Services**

### **CERTIFICATE OF FIT TESTING**

J Tech Proudly Announces that

**MARK KAZEMBA XXX-XX-8310**

has successfully completed Training and Fit Testing  
for the following respirator according to Table 16, Chapter  
286-842-200 WAC Ambient Aerosol Condensation Nuclei  
Counter (Portacount)

Full Face Piece NORTH Model 7600 Size M/L

**EXP. 3/3/08**

## **Appendix B**

### **Site Specific Hazard Analysis**



CONT. REG. NO. IRSENV1033PN

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**ENVIRONMENTAL  
SERVICES**

**ACTIVITY HAZARD ANALYSIS**

<b>Activity:</b> Remove Asbestos CAB Siding, Floor Coverings, Gasket Materials, Pipe Covering, Mastics, Adhesives, roofing and Window Removal.	<b>Date:</b> April 17, 2007  <b>Project:</b> ASARCO Phase 4 Building Cleaning and Demolition
<b>Description of the work:</b> Install negative pressure enclosure. Remove Asbestos flooring with substrate, CAB Siding and roofing, pipe covering, gaskets, adhesives from floor, roofing materials, metal sidings and roofing and window caulking. Final clean for clearance sampling, visual and air samples and ready building	<b>Site Supervisor:</b> MARK KAZEMBA  <b>Site Safety Officer:</b> _____  <b>Review for latest use:</b> Before the job is performed.

Work Activity Sequence (Identify the principal steps involved and the sequence of work activities)	Potential Health and Safety Hazards (Analyze each principal step for potential hazards)	Hazard Controls (Develop specific controls for each potential hazard)
General Conditions	Noise	Wear hearing protection during the operation of Industrial Hurricane HEPA VAC., Compressor and HEPA Vacuums. Also when working in close proximity of motorized equipment used by all trades in general work area. <ul style="list-style-type: none"> <li>Hearing protection will be worn while using power tools (ex. Skill saw, sawzall)</li> </ul>
General Conditions  General Conditions, Continued	Hand Tools  Hand Tools Continued	<ul style="list-style-type: none"> <li>Tools shall be inspected prior to use and damaged tools will be tagged and removed from service.</li> <li>Hand tools will be used for their intended use and operated in accordance with industry standards;</li> <li>All power tools equipped with a safety guard of any type shall be used only with the guard in place and functioning properly.</li> <li>Portable power tools will be plugged into GFCI protected outlets; and</li> <li>Portable power tools will be Underwriters Laboratories (UL) listed and have a three-wire grounded plug or be double insulated.</li> <li>Tools shall be used only for their intended purpose.</li> <li>All power tools shall be unplugged (electric), de-energized (battery), unhooked from air supply (pneumatic) or pressure</li> </ul>

Work Activity Sequence (Identify the principal steps involved in the sequence of work activities)	Potential Health and Safety Hazards (Analyze each principal step for potential hazards)	Hazard Controls (Develop specific controls for each potential hazard)
Preparation of plastic enclosure, working in plastic enclosure	Fire hazard	<ul style="list-style-type: none"> <li>• Insure ABC fire extinguishers are in place in every work area. One fire extinguisher for every 2,000 SF of work area per floor.</li> <li>• Insure all workers are properly trained in use of fire extinguishers.</li> <li>• NO SMOKING IS ALLOWED ON SITE IN ANY AREA!</li> </ul>
Mastic removal in enclosed work area	Fire and explosion	<ul style="list-style-type: none"> <li>• Discuss MSDS for mastic removal solvents with each worker</li> <li>• Work area will be fresh-air ventilated with a minimum of 12 air changes per hour.</li> <li>• PPE will be provided by IRS and worn, to include: Safety Glasses, ½ face respirators with appropriate cartridges, disposable polypropylene coveralls, nitrile rubber gloves and boot coverings.</li> <li>• All heat and ignition sources will be eliminated. NO SMOKING IS ALLOWED ON SITE IN ANY AREA!</li> </ul>
Preparation for Asbestos Removal  VAT Removal	Slips, trips and falls due to cords, hoses, wet working conditions.	<ul style="list-style-type: none"> <li>• Maintain housekeeping at all times to prevent tripping hazards</li> <li>• Work areas will be visually inspected and slip and trip hazards will be marked, barricaded or eliminated.</li> <li>• Proper illumination will be maintained in all work areas.</li> <li>• Warning! – Wet plastic floors are slippery. Maintain guardrails on all rolling scaffold, wear non-slip boots!</li> <li>• Warning! Piles of VAT are extremely slippery, like shale rock. Clean up VAT immediately and place in disposal container. Do not allow large accumulations of VAT on floor. DO NOT stand on VAT piles!</li> </ul>
Asbestos VAT removal, placing VAT waste in containers and disposal process.	Strains/Lifting hazards – Heavy disposal bags, vacuum hoses, tools.	<ul style="list-style-type: none"> <li>• 1. Get as close to the load as possible.</li> <li>• 2. Avoid picking up heavy objects placed below your knees.</li> <li>• 3. Keep your back straight when reaching to lift an object. Tighten your stomach muscles to keep your spine from twisting while lifting a load.</li> <li>• 4. Bend with your knees not your back.</li> <li>• Stretch and loosen up before work.</li> <li>• Change direction by moving your feet not your hips. Look ahead to make sure the path is clear.</li> <li>• Remember steps 1-4 above when putting load down or stacking.</li> </ul>
Cement asbestos Board (CAB), metal siding and roofing removal	Strains/Lifting hazards – Heavy disposal bags, vacuum hoses, tools	<ul style="list-style-type: none"> <li>• 1. Get as close to the load as possible.</li> <li>• 2. Avoid picking up heavy objects placed below your knees.</li> <li>• 3. Keep your back straight when reaching to lift an object. Tighten your stomach muscles to keep your spine from twisting while lifting a load.</li> </ul>

Work Activity Sequence (Identify the principal steps involved in the sequence of work activities)	Potential Health and Safety Hazards (Analyze each principal step for potential hazards)	Hazard Controls (Develop specific controls for each potential hazard)
Cement Asbestos Board (CAB), metal siding and roofing removal - Continued		<ul style="list-style-type: none"> <li>4. Bend with your knees not your back.</li> <li>Stretch and loosen up before work.</li> <li>Change direction by moving your feet not your hips. Look ahead to make sure the path is clear.</li> <li>Remember steps 1-4 above when putting load down or stacking</li> <li>100% Fall protection will be required for work on the roof covered under this AHA, whether it be full guardrail systems or personal fall arrest systems. Refer to the fall protection plans for details.</li> <li>In general, on roof bays, personal fall arrest systems with adequate anchorage is required if guardrail system is in place.</li> <li>Ensure that areas of suspect integrity are adequately marked and barricaded to ensure no possibility that personnel or equipment cannot fall through the roof</li> </ul>
Rolled Roofing Removal		<ul style="list-style-type: none"> <li>100% Fall protection will be required for work on the roof covered under this AHA, whether it be full guardrail systems or personal fall arrest systems. Refer to the fall protection plans for details.</li> <li>In general, on roof bays, personal fall arrest systems with adequate anchorage is required if guardrail system is in place.</li> <li>Ensure that areas of suspect integrity are adequately marked and barricaded to ensure no possibility that personnel or equipment cannot fall through the roof</li> </ul>
Man Lift Operation	<p>Operation Hazards</p> <p>Operators must "NOT"</p>	<ul style="list-style-type: none"> <li>Manlift(s) shall not be used above personnel on the ground or working on the roof.</li> <li>Read and understand the operating instructions and safety rules for the equipment being used.</li> <li>Understand all decals, warnings and instructions displayed on the work platform</li> <li>Inspect for defects that would affect a lift's safe operation. Be alert for cracked welds or other structural defects, leaks in hydraulics, damaged control cables, loose wires, or bad tires.</li> <li>Test the controls to make sure they work.</li> <li>Check the operating condition of the brakes, lights and other automotive-operating accessories, such as horns and warning devices.</li> <li>Use ladders or makeshift devices on the platform so workers can reach higher.</li> <li>Climb up or down extendable arms.</li> <li>Sit on or climb on the edge of the basket.</li> <li>Delay reporting any defects or malfunctions to the supervisor.</li> </ul>

Work Activity Sequence (Identify the principal steps involved in the sequence of work activities)	Potential Health and Safety Hazards (Analyze each principal step for potential hazards)	Hazard Controls (Develop specific controls for each potential hazard)
		<ul style="list-style-type: none"> <li>Engage in stunt driving or horseplay.</li> </ul>
Overhead demolition		<ul style="list-style-type: none"> <li>Manlift(s) shall not be used above personnel on the ground or working on the roof.</li> <li>Hard hats will be required for all overhead demolition work.</li> <li>Barricade overhead demolition zones as needed.</li> </ul>
Generators.	Fire hazards	<ul style="list-style-type: none"> <li>Fuel equipment <u>prior</u> to use each day, while equipment is cool.</li> <li>Only refuel equipment after the engine has been allowed to cool.</li> <li>Clean up spilled gas immediately.</li> <li>Ensure that gas caps are tight after refuelling and periodically during operation.</li> <li>ABC Fire extinguishers will be staged in close proximity to all tools and equipment that are being used and in refueling areas.</li> <li>Sources of ignition are prohibited in areas where equipment is being refueled.</li> </ul>
Generators	Electrical hazards	<ul style="list-style-type: none"> <li>Ensure that generators are adequately grounded to the frame of the device.</li> <li>Ensure that generators are equipped with Ground Fault Circuit Interrupters (GFCI) and that they are tested prior to use.</li> <li>Inspect electrical cords prior to use and remove damaged cords from service.</li> <li>Inspect grounded tools to ensure that the ground prong is in place and that three wire grounded temporary cords are used for these devices.</li> <li>Double insulated tools do not require a third wire grounding conductor.</li> </ul>
Regulated asbestos work area – containment.	Asbestos hazard	<ul style="list-style-type: none"> <li>Install signs and barrier tape to create regulated work area prior to any Asbestos removal activities. See asbestos removal work plan.</li> <li>Install multiple layers of 6ml floor below asbestos fireproofing removal area prior to beginning removal.</li> <li>Install multiple layers of 6ml wall covering in area where asbestos fireproofing removal is to occur prior to beginning removal.</li> <li>Install and test negative pressure enclosure and decontamination facilities prior to beginning activities which will disturb asbestos fire proofing or VAT and mastic removal.</li> <li>Only trained and certified workers will be allowed in asbestos regulated work areas.</li> <li>All workers will enter and leave regulated work area through designated decontamination area.</li> <li>Housekeeping shall be a priority. Use installed drop sheets to</li> </ul>



<b>Work Activity Sequence</b> Identify the principal steps involved in the sequence of work activities	<b>Potential Health and Safety Hazards</b> (Analyze each principal step for potential hazards)	<b>Hazard Controls</b> (Develop specific controls for each potential hazard)
Regulated asbestos work area – containment (continued)		aid prompt clean up. <ul style="list-style-type: none"> <li>• Absolutely no debris will be allowed to accumulate in work areas.</li> <li>• Workers will decontaminate using shower prior to exiting the work area.</li> <li>• All waste will be wrapped or packaged in 6ml plastic immediately.</li> <li>• All packaged waste will be stored in designated covered and locked storage container by end of each work shift.</li> <li>• All workers will wear proper PPE to include ½ face air purifying respirators (VAT and mastic) , or full faced Type C Respirators (Asbestos fireproofing) full disposable coveralls in addition to on site standard PPE.</li> </ul>
Detail Cleanup	HEPA VAC	<ul style="list-style-type: none"> <li>• Wear hearing protection during use</li> </ul>

Equipment to be used (List equipment to be used in the work activity)	Inspection Requirements (List inspection requirements for the work activity)	Training Requirements (List training requirements including hazard communication)
Detail Clean up (cont.)	Check bags and filters daily of as needed.  Check filters daily and remove debris	<ul style="list-style-type: none"> <li>• Use by trained personnel only.</li> <li>• Hearing Protection Program. ear plugs required.</li> </ul>
Hand tools (pry bars, hammers, manual scrapers)	Check handles and tool condition daily	<ul style="list-style-type: none"> <li>• Training on proper use.</li> <li>• Eye Protection.</li> </ul>
Sawzall, Circular Skilsaw.	Daily inspection	<ul style="list-style-type: none"> <li>• Training on proper use.</li> <li>• Eye Protection</li> </ul>
Main lift	Daily inspection	<ul style="list-style-type: none"> <li>• Inspect for defects that would affect a lift's safe operation. Be alert for cracked welds or other structural defects, leaks in hydraulics, damaged control cables, loose wires, or bad tires.</li> <li>• Test the controls to make sure they work.</li> <li>• Check the operating condition of the brakes, lights and other automotive-operating accessories, such as horns and warning devices.</li> </ul>

## ACTIVITY HAZARD ANALYSIS

PRINT

SIGNATURE

Supervisor Name: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

Date/Time: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

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Employee Name(s): \_\_\_\_\_

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Date/Time: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

Date/Time: \_\_\_\_\_

### ACTIVITY HAZARD ANALYSIS (Continued)

Employee Name(s): \_\_\_\_\_

Date/Time: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

Date/Time: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

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Employee Name(s): \_\_\_\_\_

Date/Time: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

Date/Time: \_\_\_\_\_

## **Appendix C**

### **ACM Removal Procedures**

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**Decontamination procedures for a full negative pressure enclosure**

**NOTE:** *OSHA 1926.65 requires all employees, visitors, and emergency response personnel to receive instructions from a designated company representative before entering areas where hazardous waste operations are being conducted.*

**ENTER:**

1. Enter the decontamination area through the clean room.
2. Remove street clothing and jewelry and place into assigned lockers.  
Check Respirator for defects and replace as needed.
3. **DO NOT** apply cosmetics, eat, drink, smoke, chew gum or tobacco once inside the decontamination area or work area.
4. Put on PPE (i.e., coveralls, respirator, boot covers, gloves)
5. Check respirator using positive/negative pressure test.
6. Pass through airlock doorways to shower area, equipment area and into the work area.

**EXIT:**

1. Remove PPE (**EXCEPT RESPIRATOR**) in the equipment room. The equipment room is designated for this purpose, with containers for used PPE. This area should be kept organized and free of asbestos and asbestos contaminated materials at all times.
2. Re-usable PPE such as boots, hard hats, safety glasses, can be cleaned and left inside the equipment room to be used upon re-entry to the work area. These items must be completely cleaned in the equipment room and in the shower if they are to be removed from the work area.
3. Proceed to the shower still wearing respirator. Wash body and respirator completely. Discard used water soaked respirator cartridges by reaching through the airlock, back into the equipment room and dropping them into the waste container provided.
4. Pass through the last air-lock and into the clean room. Dry off, and re-dress. Disinfect/clean your respirator using procedures covered in IRSE respirator protection program.

**NOTE:** IRSE requires strict adherence to the guidelines established by OSHA, and the EPA. Eating, drinking, smoking, chewing gum or tobacco or removing respirators inside a known regulated area is grounds for immediate dismissal.

Employee or visitors signature \_\_\_\_\_ Date \_\_\_\_\_

Designated IRSE decontamination representative \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
**ASARCO Phase 4 Building Cleaning and Demolition**  
**East Helena MT.**

**Min enclosure Decontamination Procedures for use during Glove Bag Removal**

A clean room will be established at the entrance to each mini enclosure constructed for glove bag removal work. The clean room will be constructed of 2 layers of 6 ml poly over wood frame. A HEPA vacuum will be used to remove asbestos contamination from the workers work suits before they leave the work area.

***ENTRY***

Workers will don two pairs of disposable coveralls over their street clothes and the appropriate respirator. Respirator fit will be checked using positive/negative pressure test. Next, workers will pass through the clean room into the mini enclosure to begin the glove bag and cut and wrap work.

***EXIT***

Worker will remove outer layer of coverall and place in an asbestos disposal bag, then immediately enter the clean room and remove the asbestos contamination from the inner tyvek coverall using a HEPA vacuum. After a thorough HEPA cleaning, the worker may remove the inner tyvek coverall, and proceed to the three stage decontamination center with shower for secondary decontamination.

***NOTE: OSHA 1926.65 requires all employees, visitors, and emergency response personnel to receive instructions from a designated company representative before entering areas where hazardous waste operations are being conducted.***

Employee or visitors signature \_\_\_\_\_ Date \_\_\_\_\_

Designated IRSE decontamination representative \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**Preparation of work area for Class One Asbestos Removal**

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: IRSE MSDS for spray adhesives.
2. Review at initial safety meeting: Emphasize the importance of ventilating the work area to reduce exposure to vapors while using spray glue.
3. Lock out / Tag out all HVAC and un used circuits within work area before beginning work.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. 1/2 face air purifying respirator with HEPA (purple) filters if friable damaged asbestos is encountered during work area preparation.
2. Disposable coveralls if friable damaged asbestos is encountered during work area preparation.
3. Safety glasses.

***PROPER PREPARATION STEPS:***

1. Seal all critical barriers at work area perimeter with double layer of 6ml poly.
2. Lock out / tag out HVAC system and un-used circuits in work area.
3. Seal all critical HVAC openings with double layer of 6ml poly.
4. Install 6ml poly floors and walls. All horizontal and vertical surfaces will be covered within the work area.
5. Cover all objects within the work area with 6ml poly secured with duct tape.
6. Install second layer of 6ml poly drop sheets over all surfaces.
7. *Install adequate Air Filtration Devices to insure 6 air changes per hour or more.* Install the Air Filtration Devices in a manner which directs the airflow away from the breathing zone of the workers.
8. Allow Air Filtration Devices to run continuously for one to two hours before removal begins to insure integrity of circuits.
9. Install a Two Stage decontaminating decon, the crew will remote to a Three Stage Decon

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

Preparation of work area for class one thermal system insulation materials removal using cut and wrap / glove bag removal methods

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: IRSE MSDS for spray adhesives.
2. Review at initial safety meeting: Emphasize the importance of ventilating the work area to reduce exposure to vapors while using spray glue.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. 1/2 face air purifying respirator purple and black filter cartridges. While using spray glue.
2. Safety glasses.

***PROPER PREPARATION STEPS:***

1. Post 3" DANGER ASBESTOS barrier tape at work area perimeter to restrict access of untrained personnel
2. Seal all critical barriers at work area perimeter with double layer of 6ml poly.
3. Install 6ml poly floors under thermal system insulation to be removed.
4. *Install adequate Air Filtration Devices to insure 6 air changes per hour or more.* Install the Air Filtration Devices in a manner which directs the airflow away from the breathing zone of the workers.
5. Allow Air Filtration Devices to run continuously for one to two hours before removal begins to insure integrity of circuits.
6. Install "Danger Asbestos" Signs at work area entrance.
7. Install Three Stage decontamination center and two stage waste load out before removal begins.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_



**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**VCI Removal**

This activity involves removal of a Class II building material. All other methods of compliance such as HEPA vacuums, wet methods, prompt clean up apply. Use of compressed air to remove ACM Materials is not allowed.

**WORK AREA PREPARATION:**

1. Review at initial safety meeting: each worker at initial safety meeting must complete IRSE Solvent Safety Checklist.
2. Review at initial safety meeting: Emphasize the importance of ventilating the work area to reduce fire hazard and exposure to vapors.

**PERSONAL PROTECTIVE EQUIPMENT:**

1. Disposable polypropylene or Tyvek coveralls.
2. Full Face Air Purifying Pressure Respirator.
3. Latex gloves.
4. Ear Plugs

**REMOVAL PROCEDURES:**

1. Prepare negative pressure enclosure/work area as per written procedures.
2. Pre wet the material before removal. Spray the material with a fine spray of amended water. Wet the material and allow the water to soak into the material until it is *wet enough to remove without causing visible emissions, but not so wet as to damage ceiling substrate below.*
3. Vacuum the material while damp and continue to spray with water as necessary to prevent visible emissions.
4. Remove gross contamination from tools and protective clothing before proceeding to the de-con chamber. Proceed to the equipment room and wash your tools and equipment. The tools and equipment must be cleaned or placed in clean bag prior to removal from work area.
5. Take containerized waste to the waste load-out. Wet wash /wipe the bag in the equipment room before passing it into a clean asbestos disposal bag held by a worker in the second clean room.
6. The second bag will be sealed immediately and placed in a locked covered secure storage dumpster or truck for transport and disposal.

IRS ENVIRONMENTAL, INC.  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

VCI Removal

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisor signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena, Montana

**Trailer Mounted Vacuum Operation**

***PRE-WORK SAFETY REQUIREMENTS:***

- 1) Review at initial safety meeting: IRS Environmental MSDS for material(s) being vacuumed.
- 2) Review at initial safety meeting: Emphasize the importance of working in pairs, proper use of pop-off valves, air horns, radio communication, ear protection, safety glass, confined space and fall protection plan.
- 3) Review at initial safety meeting: When performing the daily safety meeting, document where the mechanical relief valve is located at on the vacuum line and also who will be the monitor of the relief valve.

***PERSONAL PROTECTION EQUIPMENT:***

- 1) Half face air purifying respirator for interior cleaning and soil removal.
- 2) Full face powered air purifying respirator for attic space removal.
- 3) Hearing protection
  - a. Ear muffs and/or disposable ear plugs.
- 4) Hard hats
- 5) Safety glasses
- 6) Disposable polypropylene coveralls
- 7) Gloves
  - a. Leather style
  - b. Rubber

***PROPER OPERATION STEPS:***

- 1) Perform all maintenance checks
- 2) Ensure truck is on level and secure ground
- 3) Ensure that all body doors are closed
- 4) Properly connect vacuum hoses as required
- 5) Safe guards against dust explosions

***VACUUM SAFETY:***

- 1) When vacuuming around anything energized, examples (electrical, hydraulic, lock-out/tag out procedures will need to be performed.
- 2) Use gaskets at all times to ensure that there will be no water leaks or vacuum leaks.
- 3) Keep hands, clothing and feet away from the ends of the hose and pipes. Should you loose any items into the house; **DO NOT TRY TO RETRIEVE IT.** Allowing any body part to be pulled into the vacuum hose could be deadly.
- 4) Always follow confined space procedures when entering a confined area.
- 5) When working above the ground, you must follow the fall protection plan.
- 6) Do not operate vacuum truck RPM higher than what is needed to perform the job at hand; this could lead to damage of the vacuum hose and filters in the bag house.

- 7) Install in the vacuum line, a mechanical relief valve (pop-off valve). The mechanical relief valve will reduce and/or eliminate the possibility of an operator being injured by the vacuum hose, which could pull the operator or their loose clothing into the hose. The relief valve can be used in a 4 inch, 6 inch and 8 inch lines and will provide vacuum relief up to 27" of mercury.
- 8) When equipment is under vacuum pressure, the operator shall never leave person(s) handling the vacuum hose unattended.
- 9) Visual contact must always be present when possible between the operator and the person(s) handling the vacuum hose. When performing the daily safety meeting document what procedures will be used to maintain this contact.
- 10) If visual contact is not feasible, other methods will be used, an air horn system, two-way radio communications, a safety monitor and/or a hand held remote control system held by the person vacuuming. A person can press a switch and shut down the vacuum truck if there are any problems.
- 11) Any system used to notify the operator of the vacuum truck will be tested before work begins.

Supervisor's Signature \_\_\_\_\_ Date \_\_\_\_\_

Employee's Signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**Boiler Flange Gasket Removal Method**

This activity involves removal of a Class II building material. All methods of compliance such as HEPA vacuums, wet methods, prompt clean up apply. Use of compressed air to remove ACM Materials is not allowed.

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: IRSE power tool safety checklist. Review reciprocating saw safety features and requirements prior to operation.
2. Review at initial safety meeting: Operation of reciprocal saws requires safety glassed at all times during operation!!

***PERSONAL PROTECTIVE EQUIPMENT:***

The following personal protective equipment will be worn until a site-specific negative exposure assessment is obtained.

1. Disposable polypropylene coveralls.
2. 1/2 face air purifying respirator with HEPA cartridges.
3. Safety glasses.
4. Disposable clothe gloves

***PROPER REMOVAL STEPS:***

1. This work is to be completed inside an existing negative pressure mini enclosure installed for Class I removal of TSI.
2. Thoroughly pre-wet the gasket with amended water, and then scrape the gasket clean with a sharp putty knife.
3. Immediately place all waste in two layer 6ml disposal bags and place in a disposal dumpster, holding area or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

Class II Removal of Asphalt Asbestos Roofing, Mastic on rolled or Tab Roofing from Roof

***PRE-WORK SAFETY REQUIREMENTS:***

1. *This work activity requires a site specific fall protection plan!* Make sure one is on site before beginning roofing removal.
2. *Review site specific fall protection plan before any removal begins* at initial safety meeting. All workers new to the job site are required to review the fall protection plan and these work procedures before starting work.
3. Fall protection must be in place and inspected by IRSE Project Manger prior to working on roof.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. Disposable polypropylene coveralls or
2. Cloth coveralls
3. 1/2 face air purifying respirator purple (HEPA) filter cartridges.
4. Safety glasses.
5. Disposable cloth gloves.

***PROPER REMOVAL STEPS:***

1. Lay 10 - 20 ft. drop sheet extending from base of structure to work area perimeter.
2. Install 2" "DANGER ASBESTOS" tape at work area perimeter to restrict access of non-certified trades.
3. Remove the material as intact as possible.
4. Roofing must be removed as **wet as is feasible**.
  - Use water carefully.
  - Using water on pitched roofs creates a slip and fall hazard, use only light wetting and follow all fall protection guidelines.
5. Control dust by using effective methods of lowering roofing debris to the disposal container.
  - A. Lower unbagged /unwrapped ACM immediately to the ground via dust tight chute never allow unbagged roofing to accumulate on the roof, or:
  - B. Bag or wrap ACM roofing in poly sheeting while it is on the roof. All bagged or wrapped waste must be in the waste disposal transportation container or cube van no later than the end of the workshift.
6. Unwrapped roofing must be placed in a lined, closed, covered dumpster or truck.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**Class II Roof putty Sealant Removal**

***PRE-WORK SAFETY REQUIREMENTS:***

1. *This work activity requires a site-specific fall protection plan!* Make sure one is on site before beginning roofing removal.
2. *Review site-specific fall protection plan before any removal begins* at initial safety meeting. All workers new to the job site are required to review the fall protection plan and these work procedures before starting work.

***PERSONAL PROTECTIVE EQUIPMENT:***

The following personal protective equipment will be worn until a negative exposure assessment can be made.

1. 1/2 face air purifying respirator.
2. Safety glasses.
3. Disposable cloth gloves.
4. Disposable cloth coveralls.

***PROPER REMOVAL STEPS:***

1. Keep putty moist during removal and demolition activities.
2. Keep putty intact during removal and demolition activities.
3. Wet and separate putty using manual methods after it is exposed.
4. Remove putty intact with the metal roofing, and wrap immediately or place in lined dumpster for storage and transportation.
5. If putty needs to be separated from metal roofing, use a flat sharp hand tool and place putty immediately into asbestos disposal bags.
5. All Bagged or wrapped waste must placed in locked disposal dumpster or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena, Montana

**Metalbestos Siding and Roofing Removal Methods**

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: Cutting, abrading or sanding metalbestos panels is prohibited.
2. Review at initial safety meeting: Intentionally breaking metalbestos panels is prohibited.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. Disposable polypropylene coveralls.
2. 1/2 face air purifying respirator.
3. Safety glasses.
4. Disposable cloth gloves.

***PROPER REMOVAL STEPS:***

1. Lay 10 - 20 ft. drop sheet extending from base of panel surface to work area perimeter.
2. Install 2" "DANGER ASBESTOS" tape at work area perimeter to restrict access of non-certified trades.
3. Wet each panel or shingle before removal.
4. Cut nails with flat sharp hand tool.
5. Carefully remove wet shingle or panel to minimize breakage
6. Immediately lower panels or shingles to the ground.
7. Immediately bag or wrap CAB in labeled 6ml poly sheeting. All bagged or wrapped waste must placed in locked disposal dumpster or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_



**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena, Montana

Vacuum Lead Dust Cleaning from inside of the Blast Furnace Flue

**PRE-WORK SAFETY REQUIREMENTS:**

1. Review at safety meeting: Workers will not eat, drink, smoke, or apply cosmetics inside the lead control work area. These activities are prohibited until the employee has left the lead control work area, passed through the hygiene facility and washed thoroughly.
2. Review at safety meeting: No employee will be allowed to enter the demarcated area without attending a Lead in Construction class that meets the requirements of 29 CFR 1926.62 and WAC 296-62-054 through 05427.

**WORK AREA PREPARATION:**

1. All work under these procedures will take place within a demarcated lead control area. The boundaries of the work area will be clearly visible. 3" Barrier tape and caution signs will meet specifications called for in 29 CFR 1926.62.
2. Prepare work area by installing 6 ml drop sheets at the entrance to the work area.
3. Seal doors, install barriers to create negative pressure enclosure and prohibit migration of lead dust beyond lead control area.
4. Install Hygiene station for hand washing prior to meals, breaks, and leaving the work area.

**PERSONAL PROTECTIVE EQUIPMENT:**

1. Until exposure assessment determines worker exposure levels to be below the action level of 30ug/m<sup>3</sup> (averaged over an eight hour period) all personnel performing scraping or brushing operations will wear the following personal protective equipment:
  - 1/2 face air purifying respirator
  - Tyvek coveralls
  - Safety goggles or glasses
  - Disposable cloth work gloves
  - Ear protection
2. When results of exposure assessment are below 15 ug/m<sup>3</sup>, workers will wear the following personal protective equipment:
  - Re-usable cloth coveralls.
  - Re-usable cloth gloves.
  - 1/2 face air purifying respirator.
  - Safety glasses or goggles

### **REMOVAL PROCEDURES:**

1. Personal protective equipment, work boots, and disposable cloth coveralls will be vacuumed and left within the work area before proceeding to the **hygiene facilities** (hand and face wash station). Until exposure assessment indicates airborne lead concentrations below 30ug/m3, a thorough hand and face wash will be performed immediately following removal of protective clothing and upon leaving the lead control area.
2. A remote three stage decon will be provided for change area, its use is required. Storage areas for your street clothes will be provided.
3. The industrial vacuum will be used to clean up the lead dust through out the flue, IRSE employees will also use small brushes to remove the material from the interior top portion of the flue that is not reachable with the vacuum attachments.
4. In the unlikely event that airborne lead levels reach 1/2 of the action level(15ug/m3), all work will stop until work practices can be modified, and or engineering controls can be installed to reduce airborne lead levels.

In the unlikely event that airborne levels of lead exceed 30ug/m3 all effected employees will be required to participate in blood sampling and analysis for lead and zinc protoporphirin levels. Each employee receiving blood monitoring shall be notified of the results within five working days after IRS receives the results. (See IRS Medical surveillance program for lead removal, employee orientation)

5. Eight hour representative personnel sampling will be conducted for the task or tasks within the work area that generate the most airborne lead concentrations. All monitoring and analysis will be performed according to NIOSH Method 7082 or equivalent. All employees will be notified of the results of this analysis within five days of the exposure assessment. Exposure assessments will continue as conditions change throughout cleaning project.

### **CLEAN UP AND DISPOSAL PROCEDURES:**

1. Clean up all lead dust debris by the end of each workshift. At no time will visible dust debris be tracked or allowed to migrate from the lead control work area.
2. Place all lead dust waste in labeled and designated disposal drum prior to the end of each workshift.
3. All drums must be dated, sealed, labeled and stored in the designated hazardous waste storage area.

Supervisor/Trainer \_\_\_\_\_

Date \_\_\_\_\_

Employee \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

Flange gasket and packing rope removal – furnace seals and joints and expansion joints,

This activity involves removal of a Class II building material. All methods of compliance such as HEPA vacuums, wet methods, prompt clean up apply. Use of compressed air to remove ACM Materials is not allowed.

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: IRSE power tool safety checklist. Review reciprocating saw safety features and requirements prior to operation.
2. Review at initial safety meeting: Operation of reciprocal saws requires safety glassed at all times during operation!!

***PERSONAL PROTECTIVE EQUIPMENT:***

The following personal protective equipment will be worn until a site specific negative exposure assessment is obtained.

1. Disposable polypropylene coveralls.
2. 1/2 face air purifying respirator with HEPA cartridges.
3. Safety glasses.
4. Disposable cloth gloves

***PROPER REMOVAL STEPS:***

1. Post 3" DANGER ASBESTOS barrier tape at work and DANGER ASBESTOS signs at all approaches and access points to the regulated work area to restrict access of untrained personnel
2. Set up a mini enclosure around the abatement area.
3. Wet any exposed lining or gasket material. Wrap tightly and securely with 6 ml poly and duct tape. Cut entire fitting or duct out by cutting pipe or on each side of fitting with reciprocating saw or band saw, leaving gasket in place and intact.
4. Immediately place all waste in two layer 6ml disposal bags and place in locked disposal dumpster, holding area or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**Cutting through VAT and asbestos cutback mastic on wood sub-flooring**

This activity involves making a Class II building material friable *requires specific engineering controls, respirator protection and a regulated work area. Personnel air monitoring and daily exposure assessment is required.* Methods of compliance such as HEPA vacuums, wet methods and prompt clean up apply. Use of compressed air to remove ACM Materials is not allowed.

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: power tool cutting, abrading or sanding sheet flooring prohibited by Class II workers.
2. VAT and mastic contain asbestos and should be kept wet during cutting activities.
3. High speed cutting or abrasive disc saws must be equipped with point of cut vacuum hose attached to HEPA vacuum.
4. Dry sweeping, shoveling of other dry clean up of dust and debris is not allowed.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. Full bodied polypropylene coveralls.
2. Full face piece supplied air respirator operated in pressure demand mode, equipped with HEPA filter egress cartridges will be used until exposure assessment provides for downgrading to lesser protection.
3. Powered air-purifying respirators can be worn if exposure assessment indicates airborne asbestos breathing zone sample results less than 10 f/cc (TWA).
4. Full face piece air purifying respirators can be worn if exposure assessment indicates airborne asbestos breathing zone sample results less than 5 f/cc (TWA).
5. 1/2 face air purifying respirators can be worn if exposure assessment indicates airborne asbestos breathing zone sample results less than 1 f/cc (TWA). 3. Safety glasses.
6. Disposable cloth gloves.

***PROPER REMOVAL STEPS:***

1. Seal all critical barriers at work area perimeter.
2. Post full size DANGER ASBESTOS sign at work area entrance to restrict access of untrained personnel.
3. Lay drop sheet at entrance to work area for clean area.
4. Score, wet and remove single strip of vinyl floor tile (VAT) at cutting point.
5. Wet wood / asbestos mastic surface with amended water.
6. Cut through wood substrate with high speed cutting or abrasive disc saw equipped with point of cut vacuum hose attached to HEPA vacuum.
7. Immediately clean up all wood, mastic and tile dust with HEPA Vacuum.  
Area must be cleaned of all debris prior to flooring removal by Class II workers.
8. All bagged, wrapped waste must placed in locked disposal dumpster, holding area or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisor's signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena, Montana

**Metalbestos Siding and Roofing Removal Methods**

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: Cutting, abrading or sanding metalbestos panels is prohibited.
2. Review at initial safety meeting: Intentionally breaking metalbestos panels is prohibited.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. Disposable polypropylene coveralls.
2. 1/2 face air purifying respirator.
3. Safety glasses.
4. Disposable cloth gloves.

***PROPER REMOVAL STEPS:***

1. Lay 10 - 20 ft. drop sheet extending from base of panel surface to work area perimeter.
2. Install 2" "DANGER ASBESTOS" tape at work area perimeter to restrict access of non-certified trades.
3. Wet each panel or shingle before removal.
4. Cut nails with flat sharp hand tool.
5. Carefully remove wet shingle or panel to minimize breakage
6. Immediately lower panels or shingles to the ground.
7. Immediately bag or wrap CAB in labeled 6ml poly sheeting. All bagged or wrapped waste must placed in locked disposal dumpster or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena, Montana

Vacuum Lead Dust Cleaning from inside of the Blast Furnace Flue

**PRE-WORK SAFETY REQUIREMENTS:**

1. Review at safety meeting: Workers will not eat, drink, smoke, or apply cosmetics inside the lead control work area. These activities are prohibited until the employee has left the lead control work area, passed through the hygiene facility and washed thoroughly.
2. Review at safety meeting: No employee will be allowed to enter the demarcated area without attending a Lead in Construction class that meets the requirements of 29 CFR 1926.62 and WAC 296-62-054 through 05427.

**WORK AREA PREPARATION:**

1. All work under these procedures will take place within a demarcated lead control area. The boundaries of the work area will be clearly visible. 3" Barrier tape and caution signs will meet specifications called for in 29 CFR 1926.62.
2. Prepare work area by installing 6 ml drop sheets at the entrance to the work area.
3. Seal doors, install barriers to create negative pressure enclosure and prohibit migration of lead dust beyond lead control area.
4. Install Hygiene station for hand washing prior to meals, breaks, and leaving the work area.

**PERSONAL PROTECTIVE EQUIPMENT:**

1. Until exposure assessment determines worker exposure levels to be below the action level of 30ug/m<sup>3</sup> (averaged over an eight hour period) all personnel performing scraping or brushing operations will wear the following personal protective equipment:
  - 1/2 face air purifying respirator
  - Tyvek coveralls
  - Safety goggles or glasses
  - Disposable cloth work gloves
  - Ear protection
2. When results of exposure assessment are below 15 ug/m<sup>3</sup>, workers will wear the following personal protective equipment:
  - Re-usable cloth coveralls.
  - Re-usable cloth gloves.
  - 1/2 face air purifying respirator.
  - Safety glasses or goggles

### **REMOVAL PROCEDURES:**

1. Personal protective equipment, work boots, and disposable cloth coveralls will be vacuumed and left within the work area before proceeding to the **hygiene facilities** (hand and face wash station). Until exposure assessment indicates airborne lead concentrations below 30ug/m<sup>3</sup>, a thorough hand and face wash will be performed immediately following removal of protective clothing and upon leaving the lead control area.
2. A remote three stage decon will be provided for change area, its use is required. Storage areas for your street clothes will be provided.
3. The industrial vacuum will be used to clean up the lead dust through out the flue, IRSE employees will also use small brushes to remove the material from the interior top portion of the flue that is not reachable with the vacuum attachments.
4. In the unlikely event that airborne lead levels reach 1/2 of the action level(15ug/m<sup>3</sup>), all work will stop until work practices can be modified, and or engineering controls can be installed to reduce airborne lead levels.

In the unlikely event that airborne levels of lead exceed 30ug/m<sup>3</sup> all effected employees will be required to participate in blood sampling and analysis for lead and zinc protoporphirin levels. Each employee receiving blood monitoring shall be notified of the results within five working days after IRS receives the results. (See IRS Medical surveillance program for lead removal, employee orientation)

5. Eight hour representative personnel sampling will be conducted for the task or tasks within the work area that generate the most airborne lead concentrations. All monitoring and analysis will be performed according to NIOSH Method 7082 or equivalent. All employees will be notified of the results of this analysis within five days of the exposure assessment. Exposure assessments will continue as conditions change throughout cleaning project.

### **CLEAN UP AND DISPOSAL PROCEDURES:**

1. Clean up all lead dust debri by the end of each workshift. At no time will visible dust debris be tracked or allowed to migrate from the lead control work area.
2. Place all lead dust waste in labeled and designated disposal drum prior to the end of each workshift.
3. All drums must be dated, sealed, labeled and stored in the designated hazardous waste storage area.

Supervisor/Trainer \_\_\_\_\_

Date \_\_\_\_\_

Employee \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

Flange gasket and packing rope removal – furnace seals and joints and expansion joints,

This activity involves removal of a Class II building material. All methods of compliance such as HEPA vacuums, wet methods, prompt clean up apply. Use of compressed air to remove ACM Materials is not allowed.

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: IRSE power tool safety checklist. Review reciprocating saw safety features and requirements prior to operation.
2. Review at initial safety meeting: Operation of reciprocal saws requires safety glassed at all times during operation!!

***PERSONAL PROTECTIVE EQUIPMENT:***

The following personal protective equipment will be worn until a site specific negative exposure assessment is obtained.

1. Disposable polypropylene coveralls.
2. 1/2 face air purifying respirator with HEPA cartridges.
3. Safety glasses.
4. Disposable cloth gloves

***PROPER REMOVAL STEPS:***

1. Post 3" DANGER ASBESTOS barrier tape at work and DANGER ASBESTOS signs at all approaches and access points to the regulated work area to restrict access of untrained personnel
2. Set up a mini enclosure around the abatement area.
3. Wet any exposed lining or gasket material. Wrap tightly and securely with 6 ml poly and duct tape. Cut entire fitting or duct out by cutting pipe or on each side of fitting with reciprocating saw or band saw, leaving gasket in place and intact.
4. Immediately place all waste in two layer 6ml disposal bags and place in locked disposal dumpster, holding area or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Date \_\_\_\_\_



**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT.

**Cutting through VAT and asbestos cutback mastic on wood sub-flooring**

This activity involves making a Class II building material friable *requires specific engineering controls, respirator protection and a regulated work area. Personnel air monitoring and daily exposure assessment is required.* Methods of compliance such as HEPA vacuums, wet methods and prompt clean up apply. Use of compressed air to remove ACM Materials is not allowed.

***PRE-WORK SAFETY REQUIREMENTS:***

1. Review at initial safety meeting: power tool cutting, abrading or sanding sheet flooring prohibited by Class II workers.
2. VAT and mastic contain asbestos and should be kept wet during cutting activities.
3. High speed cutting or abrasive disc saws must be equipped with point of cut vacuum hose attached to HEPA vacuum.
4. Dry sweeping, shoveling of other dry clean up of dust and debris is not allowed.

***PERSONAL PROTECTIVE EQUIPMENT:***

1. Full bodied polypropylene coveralls.
2. Full face piece supplied air respirator operated in pressure demand mode, equipped with HEPA filter egress cartridges will be used until exposure assessment provides for downgrading to lesser protection.
3. Powered air-purifying respirators can be worn if exposure assessment indicates airborne asbestos breathing zone sample results less than 10 f/cc (TWA).
4. Full face piece air purifying respirators can be worn if exposure assessment indicates airborne asbestos breathing zone sample results less than 5 f/cc (TWA).
5. 1/2 face air purifying respirators can be worn if exposure assessment indicates airborne asbestos breathing zone sample results less than 1 f/cc (TWA). 3. Safety glasses.
6. Disposable cloth gloves.

***PROPER REMOVAL STEPS:***

1. Seal all critical barriers at work area perimeter.
2. Post full size DANGER ASBESTOS sign at work area entrance to restrict access of untrained personnel.
3. Lay drop sheet at entrance to work area for clean area.
4. Score, wet and remove single strip of vinyl floor tile (VAT) at cutting point.
5. Wet wood / asbestos mastic surface with amended water.
6. Cut through wood substrate with high speed cutting or abrasive disc saw equipped with point of cut vacuum hose attached to HEPA vacuum.
7. Immediately clean up all wood, mastic and tile dust with HEPA Vacuum.  
Area must be cleaned of all debris prior to flooring removal by Class II workers.
8. All bagged, wrapped waste must placed in locked disposal dumpster, holding area or enclosed transportation van no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisor's signature \_\_\_\_\_ Date \_\_\_\_\_

**IRS ENVIRONMENTAL, INC.**  
ASARCO Phase 4 Building Cleaning and Demolition  
East Helena MT

**Window putty removal, intact removal methods**

***PRE-WORK SAFETY REQUIREMENTS:***

1. *This work activity may require a site specific fall protection plan!* Make sure one is on site before beginning removal.
2. *Review site specific fall protection plan before any removal begins* at initial safety meeting. All workers new to the job site are required to review the fall protection plan and these work procedures before starting work.
3. *Review at initial safety meeting:* Cutting, abrading or sanding window putty is prohibited.
4. *Review at initial safety meeting:* Intentionally breaking Windows and Putty is prohibited.
5. This activity has a high possibility for cuts and lacerations. If necessary, tape windows to minimize shatter. Always wear safety glasses during window removal activities.
6. This activity requires a barricade to control access below window removal.  
*Eliminate risk of people walking below window removal operations!!*

***PERSONAL PROTECTIVE EQUIPMENT:***

1. 1/2 face air purifying respirator.
2. Safety glasses.
3. Disposable cloth gloves.

***PROPER REMOVAL STEPS:***

1. Lay 10 - 20 ft. drop sheet extending from base of building to work area perimeter.
2. Tape glass to minimize shatter.
3. Wet each widow before removal.
4. Remove and set aside trim board and shims.
5. Carefully remove wet window to minimize breakage
6. Immediately lower windows to the ground, scaffold or manlift surface, either manually or via dust tight chute.
7. Placed whole intact windows in a lined box, locked enclosed transportation container no later than the end of the work shift.

Employees signature \_\_\_\_\_ Date \_\_\_\_\_

Supervisors signature \_\_\_\_\_ Dare \_\_\_\_\_

## **Appendix D**

### **Fall Protection Plan**

# FALL PROTECTION WORK PLAN

A written fall protection work plan must be implemented by each employer on a job site where a fall hazard of 10 feet or greater exists, in accordance with Department of Labor and Industries, WISHA Regulations. The plan must be specific for each work site.

**THIS WORK PLAN WILL BE AVAILABLE ON THE JOB SITE FOR INSPECTION.**

Attached is a sample of a model fall protection work plan that may be filled out by each employer who has employees exposed above 10 feet. The following steps will help you fill out your plan.

## 1. FILL OUT THE SPECIFIC JOB INFORMATION.

Company Name:

IRS ENVIRONMENTAL OF WA

Job Name:

ASARCO Phase 4 Building Cleaning and Demolition

Date:

April 17, 2007

Job Address:

100 Smelter Road

City:

East Helena

Job Foreman:

Mark Kazemba

Jobsite Phone:

509-844-4267

## 2. FALL HAZARDS IN THE WORK AREA

INCLUDE LOCATIONS AND DIMENSIONS FOR HAZARDS

Elevator shaft: N/A

Stairwell: Stairs along the outside of the building coming from the floors above.

Leading edge: N/A

Window opening: When windows have been removed from the jam

Outside static line: N/A

Roof eave height: Various sizes

Perimeter edge: working from roof

Roof perimeter dimensions: N/A

Other fall hazards in the work area: Working from the man-basket of a all terrain articulating man lift and scissors lifts

### 3. METHOD OF FALL ARREST OR FALL RESTRAINT

(For fall protection equipment include details, such as manufacturer etc.)

Full body harness:

Used while working in the manlift

Body belt (Restraint only):

N/A

Lanyard:

Will be attached to anchor point with in the man lift basket

Dropline:

N/A

Lifeline:

Working from the roof

Restraint line: Working on flat roofs

Horizontal lifeline:

N/A

Rope grab:

Working from roof – safety lines

Deceleration device:

Used with conjunction with lanyard

Shock absorbing lanyard:

Will be attached to anchor point with in the man lift basket

Locking snap hooks:

Used on the ends of the lanyards

Safety nets:

N/A

Guard rails:

N/A

Anchorage points:

The approved by the manufacture of the manlift spot to attach a lanyard wit ha locking snap hook

Catch platform:

N/A

Scaffolding platform:

N/A

Safety monitor:

To be used on the roofs

Name of monitor, if used:

Other:

---

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#### 4. ASSEMBLY, MAINTENANCE, INSPECTION, DISASSEMBLY PROCEDURE

Assembly and disassembly of all equipment will be done according to manufacturers' recommended procedures.

(Include copies of manufacturer's data for each specific type of equipment used.)

##### Specific types of equipment on the job are:

Full body harnesses, lanyards and manlift

A visual inspection of all safety equipment will be done daily or before each use, as stated in the Employee Training Packet. Any defective equipment will be tagged and removed from use immediately. The manufacturer's recommendations for maintenance and inspection will be followed.

#### 5. HANDLING, STORAGE & SECURING OF TOOLS AND MATERIAL

Toe boards will be installed on all scaffolding to prevent tools and equipment from falling from scaffolding.

##### Other specific handling, storage and securing is as follows:

Scaffolding will not be used as of this time on site, if scaffolding is used the fall protection work plan will be amended to reflect the use of scaffolding.

## 6. OVERHEAD PROTECTION

Hard hats are required on all job sites with the exception of those that have no exposure to overhead hazards. Warning signs will be posted to caution of existing hazards whenever they are present. In some cases, debris nets may be used if a condition warrants additional protection.

Additional overhead protection will include:

No additional protection will be required at this time,

## 7. INJURED WORKER REMOVAL

Normal first aid procedures should be performed as the situation arises. If the area is safe for entry, the first aid should be done by a foreman or other certified individual.

Initiate Emergency Services – Dial 911 (where available)

Phone location: Job office and cell phone on Supervision's

First aid location: Company truck, decon trailer and company trailer, job box

Elevator location: N/A

Crane location: N/A

Other: \_\_\_\_\_ Location: \_\_\_\_\_

Rescue considerations. When personal fall arrest systems are used, the employer must assure that employees can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders, or other rescue equipment should be evaluated. In some situations, equipment that allows employees to rescue themselves after the fall has been arrested may be desirable, such as devices that have descent capability.

Describe methods to be used for the removal of the injured worker(s):

Injured worker will not be moved if the injured worker is safe from harms way. If the worker needs to be moved all precautions will be taken to not injury the worker anymore than what they are already.

## 8. TRAINING AND INSTRUCTION PROGRAM

All new employees will be given instructions on the proper use of fall protection devices before they begin work. They will sign a form stating they have been given this information. This form becomes part of the employee's personnel file.

The written fall protection work plan will be reviewed before work begins on the job site. Those employees attending will sign below. The fall protection equipment use will be reviewed regularly at the weekly safety meetings.

Date: \_\_\_\_\_

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Foreman or Job Superintendent: \_\_\_\_\_

Prior to permitting employees into areas where fall hazards exist, all employees must be trained regarding fall protection work plan requirements. Inspection of fall protection devices/systems must be made to ensure compliance with WAC 296-155-24



**Appendix E**  
**Notifications**

# APPLICATION FOR A MONTANA ASBESTOS PROJECT PERMIT AND NESHAP DEMOLITION/RENOVATION NOTIFICATION

TYPE OF APPLICATION/PERMIT (See Instructions)				ACCOUNTING CODE: 6748332 / 502702 / 02202
<input type="checkbox"/> Project Permit	<input type="checkbox"/> Project Permit Revision	<input type="checkbox"/> Courtesy Notification (NESHAP)	<input type="checkbox"/> Annual Permit	
<input type="checkbox"/> NESHAP Notification	<input type="checkbox"/> NESHAP Notification Revision	<input type="checkbox"/> Annual Permit Amendment	<input type="checkbox"/> Annual Permit w/Contractor	
TYPE OF NOTIFICATION				
<input type="checkbox"/> Renovation (R)	<input type="checkbox"/> NESHAP Demo/Reno	<input type="checkbox"/> Ordered Demolition (O)	<input type="checkbox"/> Transport (T)	
<input type="checkbox"/> Demolition (M)	<input type="checkbox"/> Courtesy (C)	<input type="checkbox"/> Emergency Renovation (E)	<input type="checkbox"/> Disposal (D)	
<input type="checkbox"/> Annual	(For Annual Permit Holders) Annual Permit		MTF	

ASBESTOS PROJECT CONTRACTOR (Operator)				
Asbestos Project Contractor, Individual or Company Name				
Mailing Address		City	County	State Zip
Telephone Number	Fax Number	Contractor Contact Person (First and Last Name)		
On-Site Project Contractor/Supervisor		Contractor/Supervisor Accreditation Number		Expiration Date

DEMOLITION/RENOVATION CONTRACTOR (Operator)				
Demolition/Renovation Contractor, Individual or Company Name				
Mailing Address		City	State	Zip County
Telephone Number	Fax Number	Contractor Contact Person (First and Last Name)		

SITE INFORMATION									
Building Name / Site									
Location Address			City	State	Zip	County			
Site Telephone Number			Location Contact Person (First and Last Name)						
Building Size (sq. ft.)	Number of Floors	Age of Site in Years	Latitude	Longitude	Township	Range	Section		

SITE/BUILDING OWNER				
Owner Name				
Mailing Address		City	State	Zip County
Telephone Number		Contractor Contact Person for Owner (First and Last Name)		

LOCATION PRESENT USE*											
* Commercial ~ Hospital ~ Industrial ~ Miscellaneous ~ Office ~ Public Building Residence ~ School ~ Ship/Boat ~ University/College ~ Vacant											
<input type="checkbox"/> C	<input type="checkbox"/> H	<input type="checkbox"/> I	<input type="checkbox"/> M	<input type="checkbox"/> O	<input type="checkbox"/> P	<input type="checkbox"/> R	<input type="checkbox"/> S	<input type="checkbox"/> B	<input type="checkbox"/> U	<input type="checkbox"/> V	
LOCATION PRIOR USE*											
<input type="checkbox"/> C	<input type="checkbox"/> H	<input type="checkbox"/> I	<input type="checkbox"/> M	<input type="checkbox"/> O	<input type="checkbox"/> P	<input type="checkbox"/> R	<input type="checkbox"/> S	<input type="checkbox"/> B	<input type="checkbox"/> U	<input type="checkbox"/> V	

PRE-RENOVATION/DEMOLITION ASBESTOS INSPECTION INFORMATION	
Is Asbestos Present? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of Inspection:
Printed Name of Inspector Who Performed Inspection	
Accreditation Number	
Expiration Date	

TYPE OF AND APPROXIMATE AMOUNT OF ASBESTOS MATERIAL							
RACM to be Abated (See Instructions)		Non-Friable ACM to be removed		Non-Friable ACM not to be abated		Amount and unit of measurement	
	RACM	CAT I	CAT II	CAT I	CAT II	Amount	Measurement
Material No. 1							<input type="checkbox"/> SF <input type="checkbox"/> LF <input type="checkbox"/> CF
Material No. 2							<input type="checkbox"/> SF <input type="checkbox"/> LF <input type="checkbox"/> CF
Material No. 3							<input type="checkbox"/> SF <input type="checkbox"/> LF <input type="checkbox"/> CF
Material No. 4							<input type="checkbox"/> SF <input type="checkbox"/> LF <input type="checkbox"/> CF
Material No. 5							<input type="checkbox"/> SF <input type="checkbox"/> LF <input type="checkbox"/> CF
Material No. 6							<input type="checkbox"/> SF <input type="checkbox"/> LF <input type="checkbox"/> CF

SCHEDULED DATES FOR ASBESTOS ABATEMENT	
Start Date (mm/dd/yy)	Complete Date (mm/dd/yy)

SCHEDULED DATES FOR DEMOLITION/RENOVATION	
Start Date (mm/dd/yy)	Complete Date (mm/dd/yy)

PROJECT DESIGN INFORMATION					
Print Name of Project Designer (PD)		(Accreditation Number/Exp. Date)			
<b>RACM WASTE TRANSPORTER</b> <input type="checkbox"/> Check if same as Abatement Contractor					
Contractor, Individual or Company Name					
Mailing Address		City	State	Zip	
Telephone Number		Fax Number	Contractor Contact Person (First and Last Name)		
RACM WASTE DISPOSAL SITE					
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Allied Waste Systems of Montana Missoula Landfill  <input type="checkbox"/> Butte Silver Bow Government Landfill  <input type="checkbox"/> City of Billings Solid Waste Division Landfill  <input type="checkbox"/> City of Hardin Class II Landfill  <input type="checkbox"/> City of Malta Landfill  <input type="checkbox"/> City of Shelby Landfill  <input type="checkbox"/> Coral Creek Landfill  <input type="checkbox"/> Daniels County Commissions Scobey Landfill  <input type="checkbox"/> Flathead County Solid Waste District Kalispell Landfill  <input type="checkbox"/> High Plains Sanitary Landfill Site 1 - Great Falls/Floweree </div> <div style="width: 50%;"> <input type="checkbox"/> Libby Class II Landfill  <input type="checkbox"/> Miles City Area Solid Waste Dist Landfill  <input type="checkbox"/> Northern MT Joint Refuse Disposal Dist Conrad Landfill  <input type="checkbox"/> Park County Refuse Disposal Dist Livingston Landfill  <input type="checkbox"/> Richland County Solid Waste Dist Sidney Landfill  <input type="checkbox"/> Sheridan County Solid Waste Dist Plentywood Landfill  <input type="checkbox"/> Valley County Refuse Dist Glasgow Landfill  <input type="checkbox"/> Valleyview Class II CCSS Waste Landfill  <input type="checkbox"/> Other: _____ </div> </div>					
THIS SECTION APPLIES TO FACILITY DEMOLITIONS/RENOVATIONS					
<i>I certify that the above information is correct and that a State-accredited asbestos inspector inspected the facility for asbestos prior to demolition/renovation. This Notice must be submitted to the Department at least 10 days prior to the start of work.</i>					
Printed Name / Signature		Date			
THIS SECTION APPLIES TO ASBESTOS PROJECTS					
<i>I certify that all work performed pursuant to the authorization of the Asbestos Abatement Project Permit will be performed in accordance with 29 CFR 1928.1101, 40 CFR 763 subpart E, 40 CFR 763.120, 40 CFR 763.121, 40 CFR 763.124, 40 CFR part 81 subpart M, §§ 75-2-501 through -519, MCA, and ARM 17.74.301 through 406. In addition, I hereby certify all asbestos-containing waste materials removed during this project will be transported properly and disposed of in a State-approved Class II landfill or similar approved asbestos disposal facility.</i>					
Printed Name / Signature		Date			
FOR ASBESTOS PROJECTS PLEASE PROVIDE PER ARM 17.74.355					
<input type="checkbox"/> A. Project design. <input type="checkbox"/> B. List of accredited asbestos personnel with their accreditation ID numbers and expiration dates. <input type="checkbox"/> C. Copy of the contract showing the contract dollar amount for asbestos abatement. <input type="checkbox"/> D. Appropriate fee (see Fee Schedule below).					
CONTRACT VOLUME	FEE	CONTRACT VOLUME	FEE	CONTRACT VOLUME	FEE
\$0-\$500	---	\$7,501-\$10,000	\$417	\$75,001-\$100,000	\$3,627
\$501-\$3,000	\$ 91	\$10,001-\$20,000	\$686	\$100,001-\$250,000	\$6,552
\$3,001-\$5,000	\$201	\$20,001-\$50,000	\$1,531	\$250,001-\$375,000	\$13,416
\$5,001-\$7,500	\$304	\$50,001-\$75,000	\$2,652	Greater than \$375,000	\$20,000
Actual Contract Volume		Fee Amount Enclosed		Check No.	
				DEPOSIT LOG NO.	
<b>Mail completed form and fee to: MT DEQ Asbestos Control Program, 1520 East 6th Avenue, PO Box 200901, Helena, MT 59620-0901</b>					
<i>Mont. Code Ann. § 75-2-503(2) requires the department to issue a permit decision within seven calendar days following receipt of a complete application for asbestos abatement projects which cost \$3000 or less. For projects exceeding \$3000, the estimated time to process and issue a decision is ten working days.</i>					
FOR EMERGENCY RENOVATIONS - APPLICATION MUST BE SUBMITTED WITHIN FIVE DAYS OF NOTIFICATION					
Date of Emergency _____ <div style="display: flex; justify-content: space-around; width: 100%;"> <span>(Start Date)</span> <span>(Complete Date)</span> </div>					
Description of the sudden, unexpected event _____ _____					
<b>IF DEMOLITION IS ORDERED BY A GOVERNMENT AGENCY, SUBMIT COPY OF GOVERNMENT ORDER</b>					

**Appendix F**  
**Material and Equipment Data**

# **Hako**

## **Minuteman**

### **Series 800 Asbestos Vacuum Systems For Safe Control & Removal of Asbestos and Other Toxic Materials**

- Wet or Dry Pick-Up
- Portable or Large Capacity
- Electric or Air-Operated
- Painted or Stainless Steel



Back Pack Asbestos Vac



6 Gallon Asbestos Vac



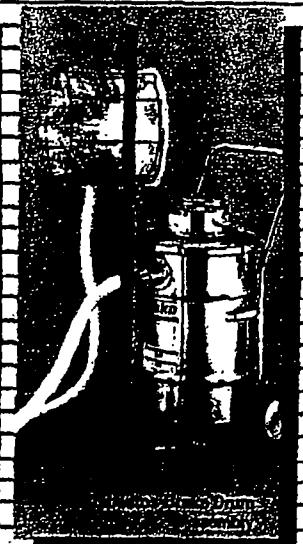
30 or 55



Twin-Powered Asbestos Vac



Air-Powered Asbestos Vac



All units equipped with H.E.P.A. filters with minimum 99.99% efficiency at 0.12 microns.

# Critical Systems

Houston, Texas

(On the side of the unit)



**NEW!**  
ALUMINUM  
MODEL AVAILABLE

## MACH 2

### NEGATIVE PRESSURE SYSTEM

#### FEATURES:

- \*HEPA Fail Safe Switch
- \*Four Easy Lift Handles
- \*Cumulative Hour Meter
- \*Static Pressure Gauge
- \*Speed Selector Switch
- \*12" Dia. Discharge
- \*4" Heavy Duty Swivel Casters
- \*18 Gauge Stainless Steel or
- \*.090 inch Aluminum Construction
- \*Intake Adaptor Available

#### OPTIONAL ALARM SYSTEM

- \*Normal (Run) - Light
- \*High Pressure (Filter Loading) - Audible & Visual Warning
- \*Low Pressure (Blocked Discharge, Filter Rupture & Shutdown) - Audible & Visual Warning

#### SPECIFICATIONS:

- \*Two Speeds: 2100 CFM 1411 CFM
- \*Dimensions: 38" L x 37.5" H x 25" W
- \*Weight: 180 lbs. with filters - Aluminum  
225 lbs. with filters - Stainless
- \*Motor: 1 3/4 Hp - Thermally Protected
- \*Power: 110 / 115 Volts / 60 Hz
- \*Full Load Amps: 15.8 Amps
- \*Circuit Protection: 20 Amps
- \*Filters: 24" x 24" x 1" Primary  
24" x 24" x 2" Secondary  
24" x 24" x 11 1/2" HEPA

**NEW!**  
HIGHER CAPACITY  
2100 CFM

In a sticky situation? Then turn to...

# ABATIX®

We've got what  
you need for  
adhesives



**\$88.00/case**

## 3M

3M2090 Blue  
Painters Tape  
&  
3M2020 Masking

1" 1.5" 2" 3"  
Call for Pricing



TYC827 – White  
Poly Tape **\$110.50**  
2" 24/case



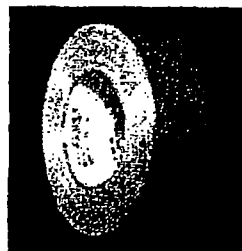
ABATIX® Brand  
Duct Tape – Case  
Quantities Only  
2" 24/case or  
3" 16/case



Nashua 398 2" 24/cs **\$94.50**  
& 3" 16/case **\$94.50** Silver

Premium 357 2" Silver **\$168.75**  
Case Quantities Only

Abatix Corp  
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98001



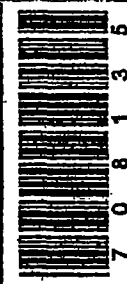
TYC809  
Yellow Vinyl  
2" 24/case  
**\$70.00**

**Toll Free 1-800-500-8355**

Prices good only through month of May

# HEAVY DUTY ADHESIVE

• Wide Web Spray  
• Temporary or Permanent Bonds  
• No Chlorinated Solvents  
• Cleans Easily with Mineral Spirits



## HEAVY DUTY ADHESIVE SPRAY

This wide web spray adhesive is one of the highest performance aerosol adhesives available. For both temporary or permanent bonding, this high solids product is ideal for uneven or porous surfaces and weight materials. Waterproof flexible transparent and non-staining, use this product for your toughest adhesive applications with materials such as leather, cardboard, most plastics, polyethylene sheeting and cloth. Formulated with the environment in mind, this product contains NO CHLORINATED SOLVENTS OR OZONE DEPLETERS. Cleans easily with Mineral Spirits. Not intended for use on vinyl.

### DIRECTIONS

Always shake well before using. Never aim valve at face. Hold can upright and apply adhesive in a side to side motion 10 to 14 inches from surface.

**TEMPORARY BONDS:** Spray surface, allow to tack and apply material to be bonded.

**PERMANENT BONDS:** Liberally spray both surface and material, allow to tack, then apply.

**CLEANING SPRAY TIP:** When finished with a particular spray application, always turn can upside down and spray for two seconds to clear valve and prevent clogging. If adhesive accumulates around nozzle wipe clear while wet. If dried in valve opening, remove with degreasing solvent.

**DANGER:** Extremely Flammable. Contains Hexane and Acetone. Use with adequate ventilation. Keep away from heat, sparks, open flame or other ignition sources. Avoid inhalation of spray mist or vapors. If overcome, move patient to fresh air. Call a physician immediately. Avoid contact with eyes and skin. In case of eye contact, flush immediately with water and continue for 15 minutes. If irritation persists, see a physician. For skin contact, wash with soap and water. If irritation persists, call a physician immediately. Harmful or fatal if swallowed. Do not take internally. If swallowed, do not induce vomiting. Contact a physician immediately. Contents under pressure. Do not puncture or incinerate container. Do not store at temperatures above 120°F. KEEP OUT OF REACH OF CHILDREN.

08/95

### Manufactured for ABATIX ENVIRONMENTAL CORP

Dallas, TX 75227-214-381-1148

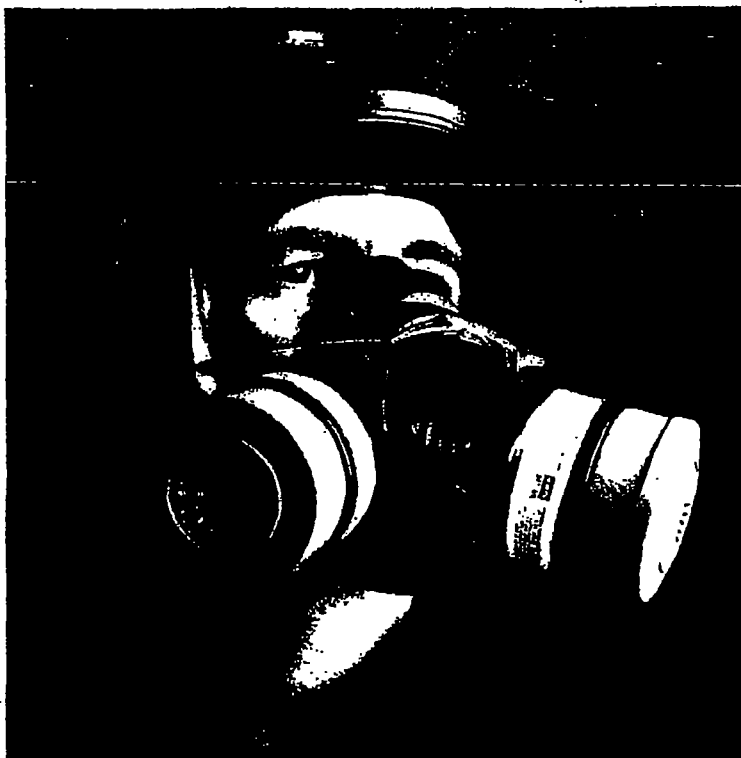
Houston, TX	713-956-2062	Hayward, CA	510-471-5997
Santa Fe Springs, CA	310-844-5445	Denver, CO	303-373-1000
Phoenix, AZ	602-437-4993	Kent, WA	206-872-6955



## **NORTH 7600 SERIES FULL FACEPIECE AIR PURIFYING RESPIRATORS**

**NIOSH/MSHA Certified**

The North 7600 Series full facepiece respirators are designed to provide eye, face and respiratory protection while providing optimum comfort. While affording an over 200° field of vision, the hard coated polycarbonate lens protects the wearer's eyes and face against irritating gases, vapors and flying particles. The polycarbonate lens also features optical properties similar to the North 180® Protective Spectacle to minimize distortion and astigmatism.



**7600 Series  
(shown with  
N7500-8 Filters)**

<b>Features</b>	<b>Benefits</b>
Dual flange	Superior fit characteristics. Less inventory and purchasing problems.
Silicone full facepiece	Soft, pliable superior comfort and fit.
Two facepiece sizes, small and medium/large	Comfortable fit for the largest number of respirator wearers.
Chin cup	Positions facepiece properly.
Designed to cover worker's entire face	Worker is provided with eye and face protection from gases, vapors and particles.
Direct cartridge-to-facepiece connection	Secure fit. Creates a cartridge-to-facepiece seal without the use of gaskets.
Cartridges have an inside thread connection	Threads are protected - less likelihood of thread damage.
5 strap head harness and comfortable	Facepiece-to-face seal is effectively maintained.
Oral/nasal cup	Reduces fogging. Lessens "dead-air" space. Standard equipment.
Speaking diaphragm	Easy communication. Standard equipment.
Cast aluminum lens clamps	Secure lens-to-facepiece seal.
Neck strap.	Allows wearer to park the respirator when not in use.
Hard coated polycarbonate lens	Excellent optics. Scratch and impact resistant. Meets impact and penetration requirements of ANSI Z87.1-1989.
Wraparound lens	Provides over 200° field of vision. Anti-claustrophobic design.
Lightweight	Adds to comfort, worker acceptance and reduced fatigue. Higher worker productivity.
Certified NIOSH/MSHA	Compliance with OSHA requirement.

## **North Safety Equipment**

# **NORTH 7700 SERIES HALF MASK AIR- PURIFYING RESPIRATORS**

NIOSH/MSHA Certified

The North 7700 Series is the most comfortable half mask respirator available today. What makes it so comfortable? For one thing, the facepiece is made of soft, hypoallergenic silicone rubber. Because silicone rubber's so much more flexible than organic rubber, it conforms to a worker's face. And three facepiece sizes make it much easier to fit your workers.

The North 7700's cradle suspension system also adds to the comfort of this respirator. The North 7700 doesn't slip like respirators with conventional strap systems. The cradle suspension gives an even seal without creating pressure points.

The low profile of the North 7700 gives workers a wide field of vision and room for protective eyewear. Its low inhalation and exhalation resistance makes breathing easier, leaving more energy for production.







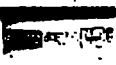
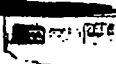




Series 7700  
(Shown with N7500-3 Cartridges)



Features	Benefits
State-of-the-art design and materials	Provides wearers with the best fitting, most comfortable facepiece, thereby improving health and safety.
Silicone facepiece material	Wearer comfort. Readily conforms to facial features and doesn't harden with age. Easy to clean. Durable. Stands up to repeated cleanings better than any other facepiece material. Resists distortion, ensuring a better fit, time after time.
Contoured sealing flange	The most comfortable, best fitting half mask facepiece available. Eliminates discomfort caused by pressure points on facial nerves. Design of nose area provides excellent fit and comfort.
Extended side flanges	Provide best possible seal during talking or other facial motions.
Low dead-air space	Improves worker comfort by limiting "re-breathing" of exhaled air.
Three overlapping facepiece sizes	Comfortable fit for largest number of respirator wearers.
Cradle suspension system	Cradle straps provide a comfortable, secure fit without slipping. Convenient side adjustment of headband straps. "One-Piece" suspension prevents loss or mis-assembly of individual straps. Easily removed for cleaning.
Headband yoke	Allows cartridges to be located lower and further back, improving side vision.
Exhalation valve assembly	Exceptionally low breathing resistance. Positive pressure fit check without removing cover.
Direct cartridge-to-facepiece seal	Eliminates the risk of improper seal and reduced protection due to lost or worn sealing gaskets. Minimizes replacement parts inventory. Ease of maintenance, no cartridge receptacles to clean.

# NORTH DUAL CARTRIDGE AND FILTER AIR-PURIFYING RESPIRATORS

	N7700-1 Organic Vapor Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Organic Vapors Approved for respiratory protection against organic vapors	7701L TC-23C-49 7701M TC-23C-48 7701S TC-23C-49	77BP01L TC-23C-102 77BP01M TC-23C-102 77BP01S TC-23C-102	7601 TC-23C-160
	N7700-1 Organic Vapor Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Organic Vapors, and Dust and Mist: Approved for respiratory protection against organic vapors, dusts and mists having a time-weighted average not less than 0.05 milligram per cubic meter or 2 million particles per cubic foot.	7711L TC-23C-73 7711M TC-23C-73 7711S TC-23C-73	77BP11L TC-23C-103 77BP11M TC-23C-103 77BP11S TC-23C-103	7611 TC-23C-165
	N7700-1 Organic Vapor Cartridge N7700-18 Paint Spray/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Paint, Lacquer, Enamel Mist and Organic Vapors Approved for respiratory protection against (1) mists of paints, lacquers and enamels (2) organic vapors or (3) any combination thereof. Do not use for protection against paints containing isocyanate.	7731L TC-23C-75 7731M TC-23C-75 7731S TC-23C-75	77BP31L TC-23C-178 77BP31M TC-23C-178 77BP31S TC-23C-178	7631 TC-23C-188
	N7700-1 Organic Vapor Cartridge N7700-63 Foamable Prefilter N7700-27 PS Cloth/Filter Cover	Foamables Approved for respiratory protection against pesticides. Not approved for lampreys.	7749L TC-23C-74 7749M TC-23C-74 7749S TC-23C-74	77BP49L TC-23C-178 77BP49M TC-23C-178 77BP49S TC-23C-178	7649 TC-23C-190
	N7700-2 Acid Gases Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Chlorine, Hydrogen Chloride, Sulfur Dioxide and Formaldehyde Approved for respiratory protection against chlorine, hydrogen chloride, sulfur dioxide or formaldehyde.	7702L TC-23C-226 7702M TC-23C-226 7702S TC-23C-226	77BP02L TC-23C-227 77BP02M TC-23C-227 77BP02S TC-23C-227	7602 TC-23C-228
	N7700-2 Acid Gases Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Chlorine, Hydrogen Chloride, Sulfur Dioxide and Formaldehyde and Dust and Mists: Approved for respiratory protection against chlorine, hydrogen chloride, sulfur dioxide or formaldehyde, dusts and mists having a time-weighted average not less than 0.05 milligram per cubic meter or 2 million particles per cubic foot.	7712L TC-23C-229 7712M TC-23C-229 7712S TC-23C-229	77BP12L TC-23C-230 77BP12M TC-23C-230 77BP12S TC-23C-230	7612 TC-23C-231
	N7700-3 Organic Vapors and Acid Gases Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Organic Vapors, Chlorine, Hydrogen Chloride, and Sulfur Dioxide Approved for respiratory protection against organic vapors, chlorine, hydrogen chloride, or sulfur dioxide.	7703L TC-23C-65 7703M TC-23C-65 7703S TC-23C-65	77BP03L TC-23C-104 77BP03M TC-23C-104 77BP03S TC-23C-104	7603 TC-23C-181
	N7700-3 Organic Vapors and Acid Gases Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Organic Vapors, Chlorine, Hydrogen Chloride, and Sulfur Dioxide and Dust and Mists: Approved for respiratory protection against organic vapors, chlorine, hydrogen chloride, or sulfur dioxide, dusts and mists having a time-weighted average not less than 0.05 milligram per cubic meter or 2 million particles per cubic foot.	7713L TC-23C-66 7713M TC-23C-66 7713S TC-23C-66	77BP13L TC-23C-105 77BP13M TC-23C-105 77BP13S TC-23C-105	7613 TC-23C-186
	N7700-4 Ammonia and Methylamine Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Ammonia and Methylamine Approved for respiratory protection against ammonia or methylamine	7704L TC-23C-63 7704M TC-23C-63 7704S TC-23C-63	77BP04L TC-23C-178 77BP04M TC-23C-178 77BP04S TC-23C-178	7604 TC-23C-182
	N7700-4 Ammonia and Methylamine Cartridge N7700-4 Dust/Mist Prefilter N7700-27 PS Cloth/Filter Cover	Ammonia and Methylamine and Dusts and Mists: Approved for respiratory protection against ammonia or methylamine, dusts and mists having a time-weighted average not less than 0.05 milligram per cubic meter or 2 million particles per cubic foot.	7714L TC-23C-64 7714M TC-23C-64 7714S TC-23C-64	77BP14L TC-23C-177 77BP14M TC-23C-177 77BP14S TC-23C-177	7614 TC-23C-187

# KLEENGUARD COVERALLS



## BASIC PROTECTION

KleenGuard BP Coveralls offer workers protection against asbestos fibers and other particles at an economical price. This fabric allows air to pass through to evaporate perspiration and cool the skin -- making workers more comfortable and reducing heat stress. Designed for short duration use including asbestos abatement.

Stock No. 010523 X-Large With Hood and Boot

Stock No. 010524 XX-Large With Hood and Boot

## GENERAL PROTECTION

KleenGuard GP Coveralls offer effective protection against many particles including asbestos fibers -- including water and water based products. KleenGuard breathes like cloth, keeping workers cooler and more comfortable. Ideal for asbestos removal jobs where significant water is used and worker might get wet.

Stock No. 010503 XX-Large White with elastic back and wrist

Stock No. 010520 Large, White with elastic back and wrist,  
attached hood and boots.

Stock No. 010521 X-Large, White with elastic back and wrist,  
attached hood and boots

Stock No. 010533 XX-Large, White with elastic back and wrist,  
attached hood and boots.

Stock No. 010525 X-Large, Grey with Hip-pocket

Stock No. 010526 XX-Large, Grey with Hip-pocket

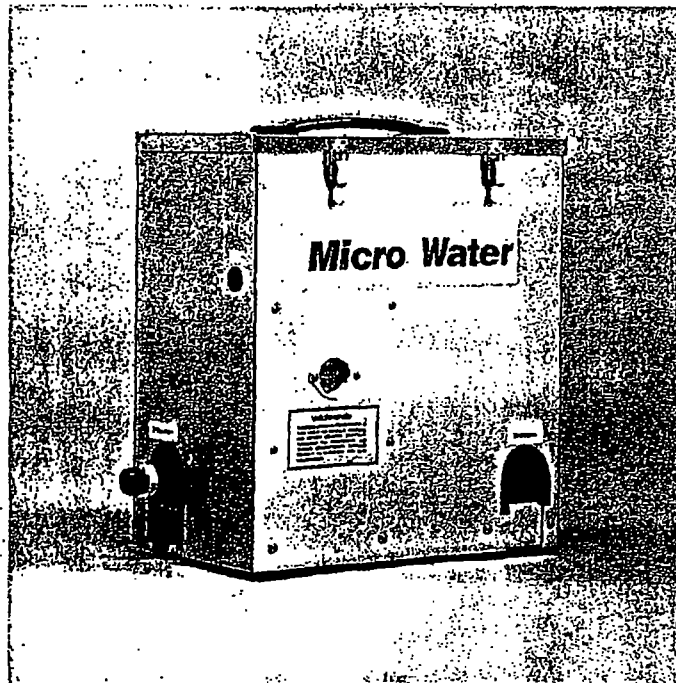
Stock No. 010518 Hood only with Elastic face

Stock No. 010519 Elastic Top Boot Cover

# Critical Systems

Houston, Texas

ADVANCED CONTROLS INDUSTRIES



## MICRO WATER

### SHOWER WATER FILTRATION SYSTEM

#### FEATURES :

- \*Compact Version of the Mini Water System
- \*High Quality Shower Water Filtration
- \*Impervious to Rust and Corrosion
- \*Enclosed in a Stainless Steel Cabinet
- \*Lightweight & Mobile
- \*Self Priming to 10 Feet of Suction Lift
- \*Built-in Electric Level Control Actuator
- \*Actuator Engages at 2.5" and Disengages at 1" of Water Level (Adjustable)
- \*Pressure Gauges on Each Stage
- \*Two Stage Filtration :
  - 1st stage : 20 Micron
  - 2nd stage : 5 Micron

#### SPECIFICATIONS :

- \*Dimensions : 10 1/2" D x 16 1/2" W x 18" H
- \*Weight : 32 lbs. Dry
- \*Water Connections : Garden Hose Thread
- \*Motor : 1/4 Hp - Thermally Protected
- \*Power : 115 Volts / 60 Hz
- \*Full Load Amps : 1.75 Amps
- \*Flow Capacity : 5.5 GPM @ 8 PSI  
4.7 GPM @ 8 PSI

# Critical Systems

TM

A Division of Critical Industries, Inc.

## MICRO WATER FILTRATION SYSTEM

### Specifications:

Dimensions:	16 1/2 in. L x 11 in. W x 18 1/2 in. H
Base and Case:	304 Stainless Steel
Weight:	30 pounds
Power supply:	115 VAC/60 Hz.
Gauges:	Pressure gauges located on both stages to indicate filter loading.
Level control:	Built in electrical level control actuator.
Flow Capacity:	"On" at 2.5 in. WC "Off" at 1 in. WC 5.5 GPM @ 7 ft. of Head 4.7 GPM @ 18.5 ft. of Head
Inlet connection:	Female or male garden hose thread.
Outlet connection:	Male garden hose thread.

### PUMP

Pump Body Material:	Bronze, chrome plated
Impeller:	Neoprene
Liq. Temperature Range:	140 degrees F to 40 degrees F
Priming:	Self priming to 10 feet of suction lift.

### MOTOR

Amps:	1.75 amps.
Protection:	Thermally protected (Automatic)
Horsepower:	1/12 Hp.

### FILTRATION

Stage I:	9.75 in. disposable 20 micron pleated polyester cartridge 5 sq. ft.
Stage II:	9.75 in. disposable 5 micron pleated polyester cartridge 5 sq. ft.
Feature:	Corrosion resistant filter housing.

## Critical Systems

A Division of Critical Industries, Inc.

TM

### MINI WATER FILTRATION SYSTEM

#### SPECIFICATION:

Dimensions:	30" L x 30" W x 28" H
Weight:	55 lbs. Dry
Power Supply:	110 VAC/60 Hz
Gauges:	Pressure gauges located on each stage indicate filter loading
Level Control:	Electric
(standard)	"ON" @ 6.75" "OFF" @ 1.5" of water
Flow Capacity:	17 gpm @ 8.5 psi
Inlet Connection:	FGHT
Outlet Connection:	MGHT

#### PUMP

Model No:	IP 862A
Housing Material:	Aluminum
Impeller:	Aluminum

#### MOTOR

Model No:	5K956B
H.P.:	1/3
RPM:	3450
Full Load Amps:	6
Frame:	56J
Service:	1.85
Thermal Protection:	Yes (Automatic Reset)

#### FILTRATION

Stage I:	Three 19.5" disposable 20 micron pleated polyester cartridges-25 sq.ft. (total)
Stage II:	Two 9.75" disposable 5 micron pleated polyester cartridges-10 sq.ft. (total)

# OMNIGUARD™ III

[Home](#) | [Accessories](#) | **Omniguard** | [Stingray](#) | [tech support](#) | [software downloads](#) | [what's new](#) | [contact ESI](#)

**features** | [details](#) | [specifications](#) | [accessories & options](#) | [distributors](#) | [tech support](#) | [software downloads](#)

The clear choice for monitoring and documenting Vacuum and Pressure in a containment area. Ideal for Asbestos, Lead and Mold abatement and Clean Room monitoring. The Omniguard III utilizes state of the art pressure measurement technology to accurately monitor negative pressure inside a containment area. With features designed to display information clearly and quickly, you'll be confident that you have the best instrument for the job.



- Large graphic display shows current pressure, monitoring status and alarm settings at a glance
- Instant on screen help
- Programmable high and low alarm setpoints
- Menu driven interface for easy setup and use
- Easy calibration in the field, temperature compensated for unsurpassed accuracy
- Dual Inlet ports allow monitoring between two areas
- Memory capacity for over 2000 readings, each pressure reading and alarm occurrence logged with individual time and date stamp
- Multiple reports available at the touch of a key
- 95 decibel audible alarm notifies workers and bystanders when containment is lost
- Relay output supports remote alarm, telephone autodialer or external fan units
- Thermal printer, no ink ribbons
- Paper stores easily in protected compartment
- Rugged self-contained unit includes power cord, owner's manual, 10' of hose and spare paper roll stored in the lid
- Serial port is easily accessible for sending logs to a PC
- Year 2000 compliant

## Configurable Features

- High and low alarm setpoints
- Date and time
- Print/log interval adjustable to



- conserve paper and memory
- Relay output can trigger remote alarm, autodialer or other external device
- Variable response rate to avoid nuisance alarms in windy environments
- Passcode protection prevents unauthorized tampering with job settings
- Pressure displayed in units of Inches WC, Millimeters WC or Pascals
- Automatic printout and logging of all changes to settings
- Configuration report prints current settings and monitoring status for easy review
- View log on screen, scroll through entire memory contents



*Designed to be the most reliable long term monitoring recorder in field, the Omniguard III offers compact design, ease of use and durability that will last from job to job.*

Top of page

Engineering Solutions Inc. • Tukwila, WA • (206) 241-9395 • Fax (206) 241-9411

## 6 GALLON H.E.P.A. FILTERED VACUUMS

These high performance 6 gal. vacuums are a must for small jobs, glove bagging, tight areas, and laboratories. With all the features of a larger vacuum, (Dry and Wet/Dry capabilities) yet light weight and portable for easy transportation.

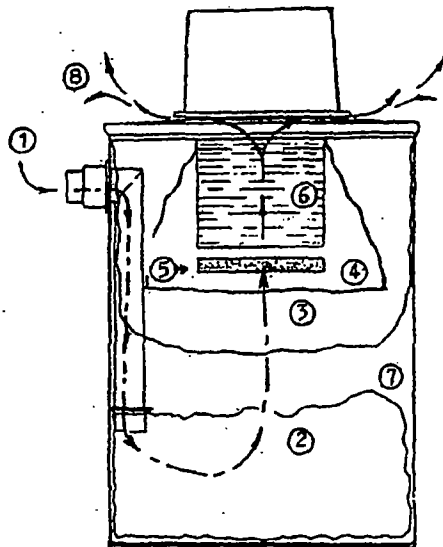
These vacuums feature a H.E.P.A. (High Efficiency Particulate Air) filter that is 99.99% efficient at 0.3 micron (D.O.P. method) - meets or exceeds OSHA and EPA re-

quirements for cleaning the air of lead, asbestos, and other toxic dust. NIKRO H.E.P.A. filtered vacuums have a five stage filtration system; Disposable paper bag, Secondary paper filter, Water Repelling/Non-Clinging Dacron filter bag, Micro-Impact filter, and the H.E.P.A. filter which is positioned in front of the motor, protecting component parts from contamination.

Whatever the application.....Turn to NIKRO for a Safer Environment.

### OPERATION

- 1) Debris enters the vacuum through the intake and travels down the tube.
- 2) The collection bag is the first of five filters. Here the bulk of the debris is collected, allowing safe, easy disposal.
- 3) The secondary paper filter traps the larger size dust particles which escape from the collection bag, protecting the life of the dacron filter bag.
- 4) The water repelling/non-clinging dacron filter bag sheds water and soot, protecting the H.E.P.A. filter from moisture, larger dust particles, etc.
- 5) The micro-impact filter is composed of specially treated, high efficiency, high density, woven fiberglass and is the most important of the four pre-filters.
- 6) The H.E.P.A. filter is the primary and most critical of the five stage filtration system. Each H.E.P.A. filter is individually tested and certified to be a minimum of 99.99% efficient at 0.3 microns by the D.O.P. Test method.
- 7) A plastic bag is situated inside the tank for clean and easy disposal of the collection bag.
- 8) Clean air is exhausted allowing for a safer environment.



### SPECIFICATIONS

Model #	Static Lift	C.F.M.	No. of Filters	Cord Length	Tank Material	Tank Size	Wet Cap.	Weight	Cart Assy.	H.E.P.A. (High Efficiency Particulate Air) filter meets or exceeds the following Military & Government specifications.
HDP0688	88"	95.	5	30'	Steel	6 gal	n/a	29	Yes	MII - F - 51079 MII - F - 510688 U/L Listed
HD00688	88"	95	5	30'	S/S	6 gal	n/a	26	Opt.	
HW00688	88"	95	5	30'	S/S	6 gal	4 gal	39	Yes	

638 N. Iowa, Villa Park, Illinois 60181  
 Telephone: 708-530-0558 FAX: 708-530-0740

# NIKRO

INDUSTRIES, INC. • 638 N. Iowa Street, Villa Park, Illinois 60181 • (708) 530-0558 • FAX (708) 530-0740

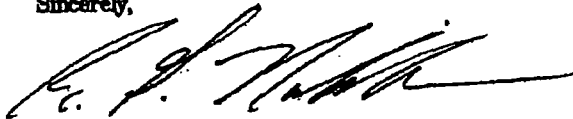
November, 1998

To Whom It May Concern:

This is to advise that all our Nikro H.E.P.A. filtered vacuums are built in accordance with and meet the ANSI Z9.2 Standards.

All of our H.E.P.A. filters are manufactured and D.O.P. Tested in accordance with MIL-STD 282 and UL586, and are registered and labeled on each individual unit by the manufacturer. All the filters we use meet, and in most cases, exceed the minimum standard of 99.97% efficiency for 0.3 micrometer particles.

Sincerely,

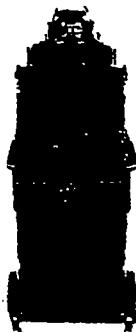


Roland G. Nicholson  
President

BGN:hc

# HEPA Vacuums

## Exceed All EPA & OSHA Filtration Standards



Model 102ASB

### Model 102ASB Vacuums

Our popular 2-horsepower 2-stage long-life motor makes this HEPA vacuum a true "work horse" for heavy duty service in professional abatement work. The 102ASB offers superior vacuum recovery, ranging from dry, light particulates, to wet, heavy debris. 102ASB12P is a heavy duty poly tank vacuum while the 102ASB DA is an adapter to be used on a steel drum.

#### Features:

- High efficiency "Drop-in" style HEPA filter individually certified to have a minimum efficiency of 99.99% at 0.3 microns (based on hot D.O.P. tests)
- Air seal gasket between the motorhead and tanks forms a positive lock fit
- Polyester prefilter is located on the bottom of the HEPA filter, and is held firmly in place with Velcro fasteners
- A Dacron filter bag covers the entire spacer sleeve and HEPA filter for three-stage filtration. Dacron material sheds dust to maintain maximum vacuum efficiency.
- 25 foot power cord.

model	horse power	water lift	cfm	recovery wet	shipping weight	product code	list price
102ASB12P	2	105"	110	12 gallon	74	B160421	\$ 1,000.00
102ASB DA	2	105"	110	55 gallon	61	B160446	\$ 1,200.00

102ASB12P price includes complete tool kit.  
\*Drum not included

#### Tool kit included:

- 10' x 1.5" hose assembly
- 5' two-piece metal wand
- standard floor brush tool
- standard floor squeegee tool
- standard carpet tool
- standard round dusting brush
- standard crevice tool

④ 102 model is U.L. approved

### HEPA Vac Attachments

	45 Dry		86 Dry		30 Dry		86/102 Wet/Dry	
description	product code	list price	product code	list price	product code	list price	product code	list price
replacement tool kit	B160424	\$ 65.00	B160450	\$ 92.50	B160425	\$ 30.50	B160456	\$ 120.00
10' x 1.5" hose assembly	B702361	\$ 21.30	B160451	\$ 25.00	B160452	\$ 25.00	B160453	\$ 25.00
5' two-piece metal wand	B702364	\$ 21.00	B521007	\$ 33.40	B521007	\$ 33.40	B521007	\$ 33.40
standard floor brush tool	B702365	\$ 15.50	B527005	\$ 19.00	B527005	\$ 19.00	B527005	\$ 19.00
standard floor squeegee tool							B527004	\$ 19.00
standard carpet tool	B702367	\$ 21.00	B527006	\$ 19.00	B527006	\$ 19.00	B527006	\$ 19.00
standard round dusting brush	B702363	\$ 3.30	B160454	\$ 9.50	B160454	\$ 9.50	B160454	\$ 9.50
standard crevice tool	B702362	\$ 2.20	B701615	\$ 4.00	B701615	\$ 4.00	B701615	\$ 4.00

### HEPA Vac Accessories

	45		86		30		102	
description	product code	list price	product code	list price	product code	list price	product code	list price
HEPA filter	B702340	\$ 213.00	B520520	\$ 200.00	B160455	\$ 202.40	B160455	\$ 202.40
spacer sleeve			B702341	\$ 10.00			B160456	\$ 10.00
dacron filter bag	B160457	\$ 17.20	B160457	\$ 17.20			B160457	\$ 17.20
prefilter			B160458	\$ 10.00			B160458	\$ 10.00
disposable paper bag	B702342	\$ 10.00	B160459	\$ 10.00	B160459	\$ 10.00	B160459	\$ 10.00
crevice bag	B524200	\$ 1.00	B160460	\$ 1.00	B160460	\$ 1.00	B160460	\$ 1.00
10' x 1.5" hose bag					B160461	\$ 10.00		
10' x 1.5" hose bag							B160462	\$ 10.00
10' x 1.5" hose bag							B160463	\$ 10.00

All prices refer to each, unless otherwise stated.

# PRODUCT DATA

## FIBERSET PM

### DESCRIPTION

Product No.: 7470 white, 7475 clear, 7480 blue

Fiberset PM is a pre-mixed "lockdown" sealing treatment for microscopic residual fibers present after removal of asbestos containing material (ACM). Fiberset PM is a ready-to-use, class "A" fire rated coating that provides a flexible barrier over residual fibers to insure final air clearance. Fiberset PM and Fiberset FT are the only UL® classified (#R13770) lockdowns accepted for fluted, cellular and corrugated deck assemblies. Fiberset PM is compatible with most leading brands of replacement fireproofing and flooring adhesives. Fiberset PM can also be used to penetrate asbestos contaminated soil in crawl spaces. Fiberset PM is a water based nontoxic coating which employs advanced 100% acrylic resin technology to extend the life expectancy of airless spray equipment.

UL Classification: ASTM E-119

UL Category: Encapsulant Materials



### PROPERTIES

- Volatile: Water
- Average particle size: 0.2 microns
- Viscosity @ 77°F: 55-60 Krebs Units
- Weight per gallon @ 77°F: 8.5 lbs.
- Film Hardness: Excellent
- Film Flexibility: Excellent
- Impact Resistance: Excellent
- Water resistance of dry film: Excellent
- Bond Strength to concrete/steel: Excellent
- Coverage: not less than 500 sq. ft./gal. (as specified by UL)
- Flash point: Tag Closed Cup, Non-combustible water based product.
- Dry Time 1 - 2 hours
- Shelf Life: @ 77°F, 36 months minimum, (in original factory sealed containers).
- Odor: virtually odorless.
- Finish: slight gloss
- Packaged: 5, and 55 gallon containers

### APPLICATION INFORMATION

**LOCKDOWN:** Sealing microscopic residual fibers after asbestos removal is mandatory on every project. Prior to post-removal air monitoring, apply one coat to all exposed surfaces. Fiberset PM has been accepted as part of a UL Classified Fireproofing System for use with Retro-Guard® manufactured by W.R. Grace & Co., Conn.

**PULLDOWN BY MISTING:** Pulldown by misting the contaminated air is an effective technique prior to post removal air-monitoring. To pull down free-floating asbestos fibers effectively, stand in the center of the room and hold the spray gun as close to the ceiling as possible. A mist should be sprayed parallel to the ceiling in every direction or in a circle. Apply one coat to the polyethylene walls and floor.

(Over)



FIBERLOCK TECHNOLOGIES, INC.

150 Dascomb Road  
Andover, MA 01810 U.S.A.  
Toll Free: (800) 342-3755  
Tel: (978) 623-9987 Fax: (978) 475-6205  
[www.fiberlock.com](http://www.fiberlock.com)

# APPLICATION PROCEDURES FOR FIBERSET PM

## PREPARATION

Prior to application, stir thoroughly to achieve a uniform consistency. Fiberset PM is pre-mixed, water addition is not necessary.

## APPLICATION EQUIPMENT

Professional models of all brands of spray equipment can be used to successfully apply Fiberset PM. Use the settings below when applying Fiberset PM:

Pressure: 2500-2700 psi  
Hose length: 100 feet  
Hose diameter: 1/4 inch  
Tip size: .015 - .025 (orifice size)  
Fan size: 12 inches

## CLEAN UP

Tools and drippings should be cleaned with soap and water before coating dries.

## SHIPPING AND STORAGE INFORMATION

Shelf Life: 3 years in sealed containers

Storage Temperature: Keep from freezing. Store in a dry place at temperatures between 40°F - 100°F

Flash Point: None.

**Note:** Fiberset PM is part of a UL Classified Fireproofing System for use with Classified types RG and RG1 cementitious mixtures manufactured by Zonolite Construction Products Division W.R. Grace & Co., Conn.

**KEEP OUT OF REACH OF CHILDREN  
FOR PROFESSIONAL USE ONLY  
KEEP FROM FREEZING**

**Caution:** Approved respirators must be used to prevent inhalation of asbestos fibers that may be present in the air. Protective clothing should be worn. Tools and drippings should be cleaned immediately with clean, soapy water before the coating dries. Careful consideration should be given to all Environmental Protection Agency (EPA), OSHA and state regulations in effect at the time of application of Fiberset PM. The EPA, through the Office of Pesticides and Toxic Substances has issued reports headed "Guidance for Controlling Friable Asbestos-Containing Materials in Buildings," EPA 560/5 85-024, June 1985, and "Managing Asbestos in Place, A Building Owner's Guide to Operations and Maintenance Programs for Asbestos Containing Materials," 207-2003, July 1990, containing the proper data, cautions, and procedures for asbestos control. Copies are available from the Environmental Assistance Division, TS-799, TSCA Assistance Information Service, U.S. EPA, 401 M Street SW, Washington, DC 20460, (202) 554-1404.

Keep from freezing. Do not store at temperatures above 100°F.

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use of this product are beyond our control. Neither Fiberlock Technologies, Inc., nor our agents shall be responsible for the use or results of use of this product or any procedures or apparatus mentioned. We recommend that the prospective user determine the suitability of Fiberset PM for each specific project and for the health and safety of personnel working in the area.

# PRODUCT DATA

## PENEWET®

### DESCRIPTION

Product No.: 6450 clear

Penewet is an ready-to-use, colorless wetting agent/surfactant solution incorporating advanced concepts in surface chemistry. It provides powerful wetting, penetrating and coalescing of asbestos containing materials (ACM) to permit handling and removal of these materials under damp, dust-free conditions. Penewet is a nonflammable water based nontoxic liquid which will not corrode aluminum components of spray equipment.

### PROPERTIES

- Solids by Weight: 10 +/-2%
- Volatile: Water
- Average particle size: 0.2 microns
- Viscosity @ 77°F: 50-55 Krebs Units
- Weight per gallon @ 77°F: 8.8 lbs.
- Ionic nature: Non-ionic
- Flammability: Non-flammable
- Phosphate free?: Yes
- Surface tension: 31 dynes/cm.
- Coverage: 500 sq.ft./gal.
- Shelf Life: @ 77°F, 36 months minimum, (in original factory sealed containers).
- Odor: Applied indoors, virtually odorless.
- Packaged: 5, and 55 gallon containers

### APPLICATION INFORMATION

**SURFACTANT/WETTING AGENT:** Penewet is a ready-to-use formulation. Sealing microscopic residual fibers after asbestos removal is mandatory on every project. Prior to post-removal air monitoring, apply one coat to all exposed surfaces prior to post removal air monitoring.

**PULLDOWN BY MISTING:** Pulldown by misting the contaminated air is an effective technique prior to post removal air-monitoring. To pull down free-floating asbestos fibers effectively, stand in the center of the room and hold the spray gun as close to the ceiling as possible. A mist should be sprayed parallel to the ceiling in every direction or in a circle. Apply one coat to the polyethylene walls and floor.

(Over)



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[www.fiberlock.com](http://www.fiberlock.com)

**Appendix G**  
**Air Monitoring Plan**



**IRS ENVIRONMENTAL, INC.**  
**ASARCO Phase 4 Building Cleaning and Demolition**

**Personal Air Monitoring Plan – Asbestos Removal**

**LABORATORY SERVICES**

Mountain Inspection and Laboratory Services, Inc.  
9922 E. Montgomery Ave. # 13  
Spokane, WA 99206  
(509) 922-1365  
(509) 922-1380

Mountain Inspection and Laboratory Services, Inc. has a fully qualified professional staff to conduct air sample analysis for airborne asbestos. This project involves the removal of the following Class I and II materials:

- TSI – Pipe insulation fittings
- CAB – Cement Asbestos Board
- Vinyl floor tile and sub flooring
- Window caulking
- Millboard
- Gaskets Materials

Air sampling to be performed

- Personnel Air Sampling to complete exposure assessments.

Mountain Inspection and Laboratory Services, Inc will perform laboratory analysis using Phase Contrast Microscopy (PCM) in accordance with NIOSH Method 7400A. Visual Inspections to document work in progress and compliance with the specifications shall be conducted by IRSE Competent Person on a daily or as needed basis. Daily project logs shall include descriptions of the work being performed, personnel onsite, hours worked, percentage of work completed, problems encountered, and information regarding air sampling and analysis.

**ABATEMENT PROJECT MONITORING**

Personnel monitoring shall be conducted as needed to collect minimum liters per sample requirements. Monitoring will commence with the first asbestos disturbance and continue until an exposure assessment for each removal activity: *Removal of pipe covering using glove bag methods, removal of CAB using wet manual methods, flooring removal using wet manual methods, window caulking, roofing material and metalbestos siding.*

**Sample Location****Sample Quantity****Work Area-Personnel****Two samples per day for each removal activity.****Work Area-Personnel Excursion****One sample per day for each activity****Outside Work Area****One sample per day at each Air Filtration Device (AFD) Exhaust.**

1. **Calibration of pumps - Conducted prior to, and after the proper run time for the samples has been achieved. A hand held rotometer, calibrated to a Buck Gilibrator once every six months will be utilized for calibration of high volume pumps.**
2. **Setting of pumps - The pumps will be placed in the breathing zone of the most contaminated worker performing each task, to provide the best overall representation of the exposure involved.**
3. **Personnel sampling - a minimum of 280 total liters of air will be collected per sample. (60 liters for Personnel excursion) Samples will be collected from the breathing zone of the most contaminated worker through a 25 mm Mixed Cellulose Ester (MCE) filter at flow rates between five (2) and (3) liters per minute.**
4. **Analysis – Mountain Inspection and Laboratory Services, Inc. personnel will analyze the air samples off site at Mountain Inspection and Laboratory Services, Inc., a NVLAP Certified Facility. The air samples will be analyzed for fiber content and concentration (fibers per square millimeter of filter area, and fibers per cubic centimeter of air sampled) using NIOSH method 7400, Fibers", August 15, 1987 revision.**
5. **Final Report - A comprehensive final report detailing the analytical results of the samples collected will be provided to MCS Environmental for review. Sample Results shall be reported to two decimal places or the quantification limit for the type of sample collected. Actual fiber levels may be included in the report, however, two decimal place accuracy shall be used for determining work practice modifications, stop work requirements, and clearance results. Sample results less than .01 shall be reported as <0.01 within the air monitoring reports.**

**Appendix H**  
**Respirator Protection Program**

# IRS ENVIRONMENTAL RESPIRATORY PROTECTION PROGRAM

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## 1.0 Introduction

It is the policy of IRS Environmental to provide and maintain a safe and healthful work place for all employees. To that end, IRS Environmental has developed this program for the selection, use and care of respiratory protection. This respirator protection program has been written to be consistent with all required Federal and State requirements.

## 2.0 Respirator Policy

Company personnel will use respiratory protection equipment where reasonable engineering controls and chemical substitution cannot minimize respiratory hazards. Engineering controls such as ventilation and substitution of less toxic materials are the first line of defense. However, engineering controls have not always been feasible for some of our operations or have not always completely controlled the identified hazards. In these situations, respirators and other protective equipment must be used.

This program applies to all employees who are required to wear respirators during normal work operations and during certain non-routine operations. Employees participating in the respiratory protection program do so at no cost to them. The expense associated with medical evaluations, training, and respiratory protection equipment will be borne by the Company.

Appropriate respiratory protection shall be used by all employees working in environments that are oxygen deficient (below 19.5 percent by volume); oxygen enriched (greater than 21.5% by volume); or in atmospheres contaminated by dusts, mists, vapors, smoke, or fumes that may exceed the permissible exposure limits (PELs) as defined by WISHA or OSHA or more stringent limits set by a specific Health and Safety Plan.

## 3.0 References

State of Washington, Department of Labor and Industries, General Occupational Health Standards, WAC 296-62-071, Respiratory Protection.

American National Standards Institute, ANSI Z88.2 1980, Practices for Respiratory Protection.

Occupational Safety and Health Administration, Code of Federal Regulations, CFR 1910.134, New OSHA Respiratory Protection Standard.

## 4.0 Program Administration

### 4.1 Safety Coordinator

The Safety Coordinator is **Carl Burnham**. The Safety Coordinator shall be responsible for the development, coordination, and administration of the IRS Environmental Respiratory Protection Program. Specific responsibilities shall include:

1. Ensuring that the Company complies with State and Federal requirements.
2. Serving as an advisor to all levels of management on matters pertaining to respiratory protection.
3. Approving the purchase of all respiratory protection equipment.

4. Implementing and reviewing a written respiratory protection program in compliance with WISHA and OSHA requirements.
5. Initiating monitoring of work areas to evaluate potential respiratory hazards and maintaining records of monitoring activities.
6. Annual inspecting of departments to evaluate program effectiveness.
7. Ensuring all personnel wearing a respirator in a negative pressure mode have received a yearly medical evaluation which determines the physiological and psychological limitations of individual wearers.
8. Instituting and maintaining appropriate medical and biomedical surveillance programs as recommended by the licensed health care professional.
9. Implementing a change schedule for respirator cartridges based on published data, historic data, and frequency of use information.

#### 4.2 On-site Supervisors

On-site Supervisors for each location shall be responsible for on-site compliance with the respiratory protection program requirements. Responsibilities shall include:

1. Ensuring that employees are provided proper respiratory protection equipment, as required.
2. Enforcing the proper use of such equipment where and when required.
3. Ensuring that employees are properly trained in the selection, care and use of respiratory protection equipment.
4. Ensuring proper maintenance and storage of respiratory protection equipment.

#### 4.3 Employee Responsibility

Each employee has a definite responsibility in contributing to the success of the respiratory protection program. These responsibilities include:

1. Use of respiratory equipment in accordance with training and instructions received.
2. Guarding against damage to equipment.
3. Observing all safety rules and regulations pertaining to respiratory protection equipment.
4. Maintaining personal grooming habits conducive to proper wearing of respiratory protection equipment (no beards or facial hair that interferes with the face to facepiece seal).
5. Receiving a medical exam and fit-test prior to initial use of a respirator and annually thereafter.
6. Reporting any malfunction of equipment to his/her immediate supervisor.
7. Inform their supervisor or the Safety Coordinator of any respiratory hazards that they feel are not adequately addressed in the workplace and of any other concerns that they have regarding the program.
8. Notify their On-site Supervisor or the Safety Coordinator of any other problems associated with using their respirator.

## **5.0 Availability of Respirators**

Each employee who wants, or is required to wear, a respirator will be issued one along with replacement parts, cartridges and filters, as needed. The selected types of respirators are available from the Safety Coordinator.

## **6.0 Selection and Use of Respirators**

The following procedures shall be used for the selection and use of respiratory protection:

1. Respiratory protection selection will provide protection to a level of exposure below established permissible exposure limits (PEL) for identified hazardous substances and health hazards.
2. The Safety Coordinator or his/her designee will conduct a exposure assessments upon initial assignment for each operation, process, or work area where airborne contaminants may be present. Selection of respiratory protection for initial assignment will be as specified within Tables 6.1 and 6.2, or as specified within project specifications.
3. Company personnel will not enter areas where they will be exposed to hazardous substances or health hazards until the On-site Supervisor has determined the proper level of protection.
4. When respiratory protection is used, IRS Environmental personnel will not enter a site without proper positive/negative respiratory fit test as well as a current and valid qualitative/quantitative (whichever appropriate as determined by the Safety Coordinator) fit test. A current and valid qualitative/quantitative fit test means the test was successfully conducted within the past 12 months, the respirator being used is the same style, manufacturer, and size as used during fit testing, and as long as the employee has not incurred facial scarring, dental changes, cosmetic surgery, or obvious change in body weight.
5. Contact lenses may be worn with a respirator in contaminated atmospheres.
6. Proper selection of respirators shall be made according to the guidance of American National Standard Practices for Respiratory Protection Z88.2-1969 (A later edition of this standard, Z88.2-1980, has been issued).
7. The Safety Coordinator will ensure that respirators selected will not impair the worker's vision, hearing, communication, and physical movement necessary to perform jobs safely.
8. Until the On-site Supervisor has determined the proper level of protection, Company personnel are not to enter areas where the known

concentrations of any material create immediately dangerous to life and health (IDLH) conditions, the Oxygen concentration is below 19.5% or above 21.5%, a lower explosive limit of 10% is reached or exceeded, or there is any indication that the atmosphere may be contaminated by dusts, mists, vapors, smoke, or fumes that may exceed the permissible exposure limits (PELs).

9. Entry into confined spaces will not be allowed unless contaminant levels are known and the space is considered safe for entry. If the space is deemed a permit-required confined space, an entry permits must be issued before personnel are allowed to enter a confined space as per the IRS Environmental Confined Space Entry Program.
10. Company personnel working in areas where the workers, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere will always work at least in pairs. Communication (visual, voice, or signal line) shall be maintained between both or all individuals present. It shall be planned that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of emergency.
11. The assigned respirator outlined in Tables 6.1 and 6.2 or protection factors in "WAC 296-62-07131, Table 1—Assigned Protection Factors" will be used when selecting respirators. Half-mask respirators can provide adequate protection for routine respirator use, where employee exposures do not exceed ten times the permissible exposure limit.

#### 6.1 Respirator Selection Based Upon Exposure

Table 6.1 lists types of respirators available to employees. Each respirator listed has specified use limits for the hazardous contaminants encountered by IRS Environmental: asbestos and lead. For other contaminants other than asbestos and lead, the Safety Coordinator will select appropriate respiratory protection.

Table 6.1: Respirator Selection Table		
Brand/Type Respirator	Use Limits Asbestos	Use Limits Lead
North 7700, ½ Face Negative Pressure	1 f/cc	500 µg/m <sup>3</sup>
North 76008A, Full Face Negative Pressure	5 f/cc	2,500 µg/m <sup>3</sup>
Racal Powerflow, Full Face Powered Air Purifying	10 f/cc	5,000 µg/m <sup>3</sup>
Neoterik SR-14, Full Face Powered Air Purifying	10 f/cc	5,000 µg/m <sup>3</sup>
Neoterik 50366CF, Full Face Supplied Air, Constant Flow with HEPA Egress	100 f/cc	10,000 µg/m <sup>3</sup>
North 85785, Full Face Supplied Air, Constant Flow with HEPA Egress	100 f/cc	10,000 µg/m <sup>3</sup>



I.S.I Safee, Full Face, Supplied Air, Pressure Demand w/HEPA Egress	100+ f/cc	10,000 $\mu\text{g}/\text{m}^3$
North 85785, Full Face, Supplied Air, Pressure Demand w/HEPA Egress	100+ f/cc	10,000 $\mu\text{g}/\text{m}^3$

**6.2 Respirator Selection – Activity Specific Respirators** are required for all employees engaged in the tasks listed in Table 6.2(A) and 6.2(B). The expected concentration range of asbestos (Table 6.2(A)) and lead (Table 6.2(B)) for each activity is shaded. Exposure ranges for some activities are wide due to hazardous constituent content of the material, work practices used, and engineering controls instituted. IRS Environmental will supply respirators for the highest concentration listed for each activity. IRS Environmental has established the following exposure data and/or consulted regulatory guidance to develop the listed activities' expected airborne concentrations. As these activities continue to be assessed and new activities are initially assessed, the Safety Coordinator will amend this section as needed.

**Table 6.2(A): Respirator Selection Table - ASBESTOS**

Removal Activity	0-1 f/cc	1-5 f/cc	5-10 f/cc	10-100 f/cc
Blanket Insulation <sup>1</sup>				
Boiler Insulation <sup>1</sup>				
Boiler Breaching <sup>1</sup>				
Cement Asbestos Board				
Ceiling Tile				
Caulking				
Duct Tape				
Duct Covering <sup>1</sup>				
Floor Tile - Manual				
Mastic - Manual				
Mastic - "Blastrak"				
Flex Gaskets on Ducts				
Hard Pipe Fittings, Glovebag				
Hard Pipe Fittings, No Glovebag				
Linoleum Felt Backing				
Pipe Insulation "Aircell" - Glovebag				
Pipe Insulation "Aircell" - No Glovebag				
Pipe Insulation - Contained Block				
Roofing - Asphalt Impregnated				
Roofing - Felt				
Spray Texture - "Popcorn" <sup>1</sup>				
Structural Fireproofing - Hard <sup>1</sup>				
Structural Fireproofing - Loose <sup>1</sup>				
Rope Material				
Tank Insulation - Block				
Tank Insulation - "Aircell"				
Wall Board				
Window Glazing				

<sup>1</sup> Minimum respiratory requirement in Washington State is at least full face, supplied air, constant flow.

**Table 6.2(B): Respirator Selection Table - LEAD**

Removal Activity	0 - 500 µg/m <sup>3</sup>	501-2,500 µg/m <sup>3</sup>	2,501+ µg/m <sup>3</sup>
Open Abrasive Blast Cleaning with Expendable Abrasives			
Open Abrasive Blast Cleaning with Recyclable Abrasives			
Torch Cutting			
Torch Burning			
Welding			
Using Lead Containing Mortar			
Lead Burning			
Rivet Busting			
Mechanical Cleaning (with Power Tools)			
Cleanup of Abrasive Blast Cleaning with Expendable Abrasives			
Abrasive Blast Enclosure Movement			

## **Appendix I**

### **Site Layout**



**Appendix J**  
**Laboratory Certifications**

United States Department of Commerce  
National Institute of Standards and Technology



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**Certificate of Accreditation to ISO/IEC 17025:1999**

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NVLAP LAB CODE: 101890-0

**Mountain Laboratories**  
Spokane, WA

*is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in  
NIST Handbook 150:2001 and all requirements of ISO/IEC 17025:1999.  
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:*

**BULK ASBESTOS FIBER ANALYSIS**

2006-10-01 through 2007-09-30

*Effective dates*



*Sally J. Bruce*  
\_\_\_\_\_  
For the National Institute of Standards and Technology



Your Essential  
Connection

11/15/2006

Karen Drader  
Mountain Laboratories  
9922 E. Montgomery  
Suite 13  
Spokane, WA 99206

Lab ID# 101129

Dear Karen,

Please find your laboratory's Industrial Hygiene Proficiency Analytical Testing (IHPAT) results for Round 167. The deadline for ordering a retest is December 1, 2006. IHPAT Round 168 sample kits will be mailed to laboratories around January 1, 2007. Your laboratory's data will be due by 11:59pm EST on February 1, 2007. The analytes for round 168 are:

- Metals – cadmium, chromium, lead
- Asbestos – amosite
- Silica – coal dust/talc
- Organics – methyl ethyl ketone(MEK), methyl isobutyl ketone(MIK)
- Diffusive – benzene, toluene, o-xylene

Please handle, store and analyze your laboratory's PAT samples in the same manner as routine client samples. To submit your laboratory's data, please visit the Proficiency Analytical Testing (PAT) page and click on the PAT Data Entry Portal:

<http://www.aiha.org/Content/LQAP/PT/pt.htm>

Your laboratory's password needed to access the PAT Data Entry Portal is provided in the upper right hand corner (next to your lab ID#) of the address label on the results submission form included with your PAT samples.

Print and save the confirmation page after submitting data via the AIHA PAT Data Entry Portal.

The AIHA Laboratory Quality Assurance Programs Policies and Application for AIHA accreditation are available on-line.

<http://www.aiha.org/Content/LQAP/documents/documents.htm>

Note: The Policies for 2006 comply with ISO/IEC 17025: 1999.

I encourage you to contact me with any feedback, questions or if you wish to contest your results at (703) 846-0797.

Sincerely,

Natasha Sekitoleko  
PAT Data Specialist

## Industrial Hygiene Proficiency Analytical Testing Results

This document contains three sub-reports relating to IHPAT Round 167. The first report contains your laboratory's results listed per contaminant, per sample. The second report contains your current and 2 previous test round performance respectively (where applicable), and the final report contains summary results for all laboratories for IHPAT round 167.

### Testing Results for IHPAT Round 167

This part of the report contains your laboratory's results listed per contaminant, per sample.

Contaminant	Units	#	Result	Ref. Value	Lower Limit	Upper Limit	z-Score	Rating
Asbestos / Fibers (ASB)	f/mm2	1	216	262	128	442	-0.9	A
	f/mm2	2	81	101	49	170	-1.0	A
	f/mm2	3	144	188	92	319	-1.3	A
	f/mm2	4	101	98	48	186	0.1	A

**Please note:**

Reference value is the mean of the reference laboratories

Lower limit = reference value - 3 standard deviations

Upper limit = reference value +3 standard deviations

A: Acceptable Analysis; U: Unacceptable Analysis

Z-score = (reported result - reference value)/standard deviation

**Note:** The acceptability of reported results is based on upper and lower performance limits. This is why a reported result may appear unacceptable according to z-score, but be identified as acceptable.



### Overall Performance Summary Concluding with 167

The following table contains your laboratory's current and 2 previous test rounds performance respectively (where applicable). For more information in regard to the determination of proficiency, please see Policy Module 6B, Section 6B.2 for IHPAT and Policy Module 6C Section 6C.2 for ELPAT Lead-in-Air located at: <http://www.aiha.org/Content/LQAP/documents/accredpolicymods.htm>

Sample	Round	Round Performance	Round Score	Proficiency Status - Three Round Score
Asbestos	165	4/4	Pass	
	166	4/4	Pass	
	167	4/4	Pass	P

**Please note:**

The denominators represent the total number of samples analyzed.

The numerators represent the number of acceptable results.

Pass: Round Score  $\geq$  75%      Fail: Round Score < 75%

P – Proficient; NP – Non-proficient.

A laboratory is rated proficient (P) for the associated FoT/Method(s), if the laboratory has a passing score for the applicable PT analyte class in two (2) of the last three (3) consecutive PT rounds. A laboratory is rated non-proficient (NP) for the applicable FoT/Method if the laboratory has failing scores for the associated PT analyte class in two (2) of the last three (3) consecutive PT rounds.

If a laboratory receives samples and does not report the data, the results will be treated as outliers.

### Performance of all Labs for IHPAT Round 167

The following table contains aggregate results for all laboratories participating in IHPAT round 167.

Contaminant	#	Ref. Value	Std Dev	RSD (%)	Total Labs	Total Acceptable	Low Outlier	High Outlier
Cadmium (CAD)	1	0.00780	0.00040	5.1	196	186	6	4
	2	0.00420	0.00020	4.9	196	183	5	8
	3	0.01590	0.00081	5.1	196	191	4	1
	4	0.01170	0.00066	5.6	198	188	6	2
Lead (LEA)	1	0.0902	0.0046	5.1	197	193	3	1
	2	0.0607	0.0028	4.6	197	194	3	0
	3	0.1191	0.0057	4.7	197	195	2	0
	4	0.0312	0.0015	4.9	197	192	2	3
Zinc (ZIN)	1	0.0807	0.0044	5.4	195	187	5	3
	2	0.1196	0.0053	4.4	195	182	9	4
	3	0.1585	0.0083	5.2	195	185	8	2
	4	0.0412	0.0026	6.2	195	183	6	6
Silica (SIL)	1	0.1076	0.0215	20.0	58	56	2	0
	2	0.1588	0.0251	15.8	58	57	1	0
	3	0.0616	0.0123	20.0	58	57	0	1
	4	0.0838	0.0168	20.0	58	56	2	0
Asbestos / Fibers (ASB)	1	262	52	20.0	759	659	82	18
	2	101	20	20.0	759	644	47	68
	3	188	38	20.0	759	674	53	32
	4	98	20	20.0	759	703	29	27
Methanol (MOH)	1	0.7841	0.0749	9.6	157	148	5	4
	2	0.1154	0.0128	11.1	157	144	5	8
	3	0.2483	0.0262	10.5	157	149	2	6
	4	0.3467	0.0328	9.5	157	147	5	5

**Appendix K**  
**Material Safety Data Sheet (MSDS)**

AMREP INC

-- HEAVY DUTY ADHESIVE

=====

MSDS Safety Information

=====

FSC: 8040

MSDS Date: 09/14/1992

MSDS Num: BXJBH

LIIN: 00N058978

Product ID: HEAVY DUTY ADHESIVE

MFN: 01

Responsible Party

Cage: 3V338

Name: AMREP INC

Address: 990 INDUSTRIAL PK DR

City: MARIETTA GA 30062

Info Phone Number: 404-422-2071

Emergency Phone Number: 800-255-3924

Preparer's Name: ES/KD

Published: Y

=====

Contractor Summary

=====

Cage: 3V338

Name: AMREP INC

Address: 990 INDUSTRIAL PK DR

City: MARIETTA GA 30062-2433

Phone: 404-422-2071

=====

Ingredients

=====

Cas: 67-64-1

RTECS #: AL3150000

Name: ACETONE (SARA 313) (CERCLA)

% Wt: 30-40

OSHA PEL: 1000 PPM

ACGIH TLV: 750PPM/1000STEL

EPA Rpt Qty: 5000 LBS

DOT Rpt Qty: 5000 LBS

-----

Cas: 110-54-3

RTECS #: MN9275000

Name: HEXANE (CERCLA)

% Wt: 10-15

OSHA PEL: 500 PPM

ACGIH TLV: 50 PPM

EPA Rpt Qty: 1 LB

DOT Rpt Qty: 1 LB

-----

Cas: 75-28-5

RTECS #: TZ4300000

Name: PROPANE, 2-METHYL-; (ISOBUTANE)

% Wt: 40-45

OSHA PEL: 1000 PPM (MFR)

ACGIH TLV: 1000 PPM (MFR)

=====

Health Hazards Data

=====

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route Of Entry Inds - Inhalation: YES

Skin: YES

Ingestion: NO

Carcinogenicity Inds - NTP: NO

IARC: NO

OSHA: NO

Effects of Exposure: ACUTE: INHAL: EXCESSIVE INHAL OF VAPS CAN CAUSE NASAL

& RESP IRRIT, DIZZ, WEAK, NAUS, HDHC, POSS UNCON/ASPHYXIATION. EYES: IRRIT. SKIN: IRRIT DUE TO DEFAT OF SKIN. INGEST: POSS CHEM PNEUMIT IF ASPIRED

INTO LUNGS. CHRONIC: EXCESSIVE INHAL OF HEXANE MAY CAUSE NERVE DMG. Explanation Of Carcinogenicity: NOT RELEVANT.

Signs And Symptions Of Overexposure: SEE HEALTH HAZARDS.

Medical Cond Aggravated By Exposure: MAY AGGRAVATE EXISTING EYE, SKIN, OR UPPER

RESPIRATORY CONDITIONS.

First Aid: EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES. IF IRRITATED, SEE

MD. SKIN: WASH WITH SOAP AND WATER. IF IRRITATED, SEE MD. INHAL: REMOVE TO

FRESH AIR. RESUSCITATE IF NECESSARY. GET MEDICAL AID. INGES T: DO NOT INDUCE

VOMITING. CALL MD IMMEDIATELY.

#### Handling and Disposal

Spill Release Procedures: ABSORB WITH SUITABLE MEDIUM.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: INCINERATE OR LANDFILL ACCORDING TO LOCAL, STATE, AND

FEDERAL REGULATIONS. DO NOT FLUSH INTO SEWERS. AEROSOL CANS WHEN VENTED TO

ATMOSPHERIC PRESSURE THROUGH NORMAL USE, POSE NO DISPOSAL HAZARD.

Handling And Storage Precautions: DO NOT PUNCTURE OR INCINERATE CONTAINERS. DO

NOT STORE AT TEMPERATURES ABOVE 130F.

Other Precautions: AVOID FOOD CONTAMINATION. KEEP OUT OF REACH OF CHILDREN.

REMOVE IGNITION SOURCES. AVOID BREATHING VAPORS.

#### Fire and Explosion Hazard Information

Flash Point Text: FLAMMABLE

Extinguishing Media: FOAM, DRY CHEMICAL, CARBON DIOXIDE, WATER.

Fire Fighting Procedures: WEAR NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP (FP

N). USE WATER FOG TO COOL CONTRS TO PREVENT RUPTURING & EXPLODING CONTRS.

PROVIDE SHIELDING FOR PERSONNEL.

Unusual Fire/Explosion Hazard: EXTREMELY FLAMMABLE. DO NOT EXPOSE AEROSOLS TO

TEMPERATURES ABOVE 130F OR THE CONTAINER MAY RUPTURE.

#### Control Measures

Respiratory Protection: IF VAPOR CONCENTRATION EXCEEDS TLV, USE  
NIOSH/MSHA

APPROVED RESPIRATOR IN POSITIVE PRESSURE MODE.

Ventilation: ADEQUATE VENTILATION TO KEEP VAPOR CONCENTRATION BELOW  
TLV.

Protective Gloves: NEOPRENE GLOVES.

Eye Protection: ANSI APPROVED CHEM WORKERS GOGGLES (FP N).

Other Protective Equipment: NONE.

Work Hygienic Practices: WASH WITH SOAP AND WATER BEFORE HANDLING FOOD.  
REMOVE

CONTAMINATED CLOTHING.

Supplemental Safety and Health: NONE SPECIFIED BY MANUFACTURER.

=====

Physical/Chemical Properties

=====

Vapor Pres: 80 PSIG

Spec Gravity: 0.853 (H\*20=1)

Solubility in Water: PARTIAL

Appearance and Odor: STRAW COLORED LIQUID, WITH KETONE SOLVENT ODOR

=====

Reactivity Data

=====

Stability Indicator: YES

Stability Condition To Avoid: OPEN FLAME, WELDING ARCS, HEAT, SPARKS.

Materials To Avoid: STRONG OXIDIZING AGENTS.

Hazardous Decomposition Products: CARBON DIOXIDE, CARBON MONOXIDE.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization: NOT RELEVANT.

=====

Toxicological Information

=====

Ecological Information

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MSDS Transport Information

=====

Regulatory Information

=====

Other Information

=====

HAZCOM Label

=====

Product ID: HEAVY DUTY ADHESIVE

Cage: 3V338

Company Name: AMREP INC

Street: 990 INDUSTRIAL PK DR

City: MARIETTA GA

Zipcode: 30062-2433

Health Emergency Phone: 800-255-3924

Label Required IND: Y

Date Of Label Review: 04/20/1995

Status Code: C

Label Date: 04/20/1995

Origination Code: G  
Chronic Hazard IND: Y  
Eye Protection IND: YES  
Skin Protection IND: YES  
Signal Word: DANGER  
Respiratory Protection IND: YES  
Health Hazard: Moderate  
Contact Hazard: Slight  
Fire Hazard: Severe  
Reactivity Hazard: None  
Hazard And Precautions: EXTREMELY FLAMMABLE. ACUTE: INHAL: EXCESSIVE  
INHALATION  
OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS,  
WEAKNESS,  
NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS OR ASPHYXIATION. EYES: IRR  
ITATION. SKIN: IRRITATION DUE TO DEFATTING OF SKIN. INGEST: POSSIBLE  
CHEMICAL  
PNEUMONITIS IF ASPIRED INTO LUNGS. CHRONIC: EXCESSIVE INHALATION OF  
HEXANE  
MAY CAUSE NERVE DAMAGE.

=====

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of Defense or other government situation.

# Material Safety Data Sheet

## Section 1 Product and Company Identification

**Product Name:** Duct Tape

**Revision #:** 2.3 **Date Prepared:** June 3, 1993 **Date Revised:** September 16, 1998

**Manufacturer:**

**Supplier/Importer:**

**LA-CO INDUSTRIES, Inc./Markal Co.**

**1201 Pratt Blvd.**

**Elk Grove Village, IL, USA**

**60007-5746**

**Information Telephone:** 847-956-7600

**Emergency Telephone:** Call CHEMTREC

**USA 800-424-9300**

**International (Call Collect) 1-703-527-3887**

**Chemical Formula:** Mixture

## Section 2 Labeling

HMIS: 010

NFPA: 110

WHMIS (CANADA): NONE

EPA HAZARDS: NONE

## Section 3 Hazardous Ingredients

NO INGREDIENTS CONSIDERED HAZARDOUS UNDER OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200.

AN INERT TAPE COMPOSED OF COTTON CLOTH AND POLYETHYLENE SHEETING WITH A CALENDERED RUBBER ADHESIVE SYSTEM. NO FUMES WILL RESULT FROM THE PROPER USE OF THIS TAPE.

## Section 4 Physical/Chemical Characteristics

**BOILING POINT:** N.A.

**SPECIFIC GRAVITY (H<sub>2</sub>O=1):** N.A.

**VAPOR PRESSURE (mmHg):** N.A.

**VAPOR DENSITY (AIR=1):** N.A.

**MELTING POINT:** N.A.

**SOLUBILITY IN WATER:** N.A.

**EVAP. RATE (butyl acetate=1):** N.A.

**APPEARANCE:** SILVER TAPE



**Product Name:** Duct Tape  
**Revision #: 2.3**    **Date Prepared:** June 3, 1993    **Date Revised:** September 16, 1998

## **Section 5            Fire and Explosion Hazard Data**

FLASH POINT (method used): N.A.

FLAMMABLE LIMITS:

LEL: N.A.

UEL: N.A.

EXTINGUISHING MEDIA: N.A.

SPECIAL FIRE FIGHTING PROCEDURES: N.A.

UNUSUAL FIRE AND EXPLOSION HAZARDS: N.A.

## **Section 6            Reactivity Data**

STABILITY: STABLE

CONDITIONS TO AVOID: N.A.

INCOMPATIBILITY (MATERIALS TO AVOID): N.A.

HAZARDOUS DECOMPOSITION PRODUCTS: OXIDES OF CARBON IF BURNED.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: N.A.

## **Section 7            Health Hazard Data**

ROUTES OF ENTRY:

INHALATION? NO

SKIN? NO

INGESTION? NO

HEALTH HAZARDS: NONE

CARCINOGENICITY:

NTP? NO

IARC? NO

OSHA? NO

SIGNS AND SYMPTOMS OF EXPOSURE: N.A.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: N.A.

EMERGENCY AND FIRST AID PROCEDURES: N.A.

## **Section 8            Precautions For Safe Handling and Use**

RELEASE AND SPILL PROCEDURES: SOLID FINISHED PRODUCT DOES NOT LEAK OR SPILL

WASTE DISPOSAL METHOD: N.A.

HANDLING AND STORAGE PRECAUTIONS: N.A.

OTHER PRECAUTIONS: N.A.

## **Section 9            Control Measures**

RESPIRATORY PROTECTION: N.A.

**Product Name:** Duct Tape  
**Revision #: 2.3**    **Date Prepared:** June 3, 1993    **Date Revised:** September 16, 1998

**VENTILATION:**

LOCAL EXHAUST: N.A.  
SPECIAL: N.A.  
MECHANICAL (GENERAL): N.A.  
OTHER: N.A.

**PROTECTIVE GLOVES:** N.A.

**EYE PROTECTION:** N.A.

**OTHER PROTECTIVE EQUIPMENT:** N.A.

**WORK/HYGIENIC PRACTICES:** N.A.

<b>Section 10</b>
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<b>Other Information</b>
--------------------------

MSDS Prepared By: Director of Chemical Safety

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA AVAILABLE TO US AND IS ACCURATE AND RELIABLE TO THE BEST OF OUR KNOWLEDGE AND BELIEF. HOWEVER, LA-CO INDUSTRIES, INC. MAKES NO REPRESENTATIONS AS TO ITS COMPLETENESS OR ACCURACY. INFORMATION IS SUPPLIED ON CONDITION THAT PERSONS RECEIVING SUCH INFORMATION WILL MAKE THEIR OWN DETERMINATION AS TO ITS SUITABILITY FOR THEIR PURPOSES PRIOR TO USE. IN NO EVENT WILL LA-CO INDUSTRIES, INC. BE RESPONSIBLE FOR DAMAGES OF ANY NATURE WHATSOEVER RESULTING FROM THE USE OF OR RELIANCE UPON THE INFORMATION CONTAINED HEREIN.

POLY-AMERICA INC  
EDGING

-- POLYETHYLENE SHEETING/BAGS/LAWN

=====

MSDS Safety Information

=====

FSC: 6850  
MSDS Date: 05/01/1995  
MSDS Num: BZDHP  
LIIN: 00F047749  
Product ID: POLYETHYLENE SHEETING/BAGS/LAWN EDGING  
MFN: 01  
Responsible Party  
Cage: 66830  
Name: POLY-AMERICA INC  
Address: 2000 W MARSHALL DR  
City: GRAND PRAIRIE TX 75051-2795  
Info Phone Number: 214-647-4374  
Emergency Phone Number: 214-647-4374  
Review Ind: Y  
Published: Y

=====

Preparer Co. when other than Responsible Party Co.

=====

Cage: 66830  
Name: POLY-AMERICA INC  
Address: 2000 W MARSHALL DR  
City: GRAND PRAIRIE TX 75051-2795

=====

Contractor Summary

=====

Cage: 66830  
Name: POLY-AMERICA INC  
Address: 2000 W MARSHALL DR  
City: GRAND PRAIRIE TX 75051-2795  
Phone: 214-647-4374

=====

Ingredients

=====

Name: POLYETHYLENE COPOLYMER

-----  
Name: POLYETHYLENE HOMOPOLYMER

=====

Health Hazards Data

=====

Route Of Entry Inds - Inhalation: NO  
Skin: NO  
Ingestion: YES  
Carcinogenicity Inds - NTP: NO  
IARC: NO  
OSHA: NO  
Effects of Exposure: EYES: SOLID/DUST MAY CAUSE IRRITATION/CORNEAL INJURY.

SKIN: NEGLIGIBLE HAZARD. INHALATION: NEGLIGIBLE HAZARD AT AMBIENT TEMPERATURE. INGESTION: MINIMAL TOXICITY.

Explanation Of Carcinogenicity: NONE

Signs And Symptoms Of Overexposure: EYES: SOLID/DUST MAY CAUSE

IRRITATION/CORNEAL INJURY. SKIN: NEGLIGIBLE HAZARD. INHALATION:  
NEGLIGIBLE

HAZARD AT AMBIENT TEMP. INGESTION: MINIMAL TOXICITY.  
First Aid: SKIN: MOLTEN PLASTIC SHOULD BE TREATED W/COLD WATER BEFORE  
PLASTIC

IS REMOVED, THEN WRAP IN CLEAN GAUZE. OBTAIN MEDICAL ATTENTION IN ALL  
CASES.

=====  
Handling and Disposal  
=====

Spill Release Procedures: NON-HAZARDOUS, DEGRADE VERY SLOWLY & MAY  
BECOME A

NUISANCE. RECYCLE OLD/UNUSED PLASTIC WHEN POSSIBLE.  
Waste Disposal Methods: DISPOSE OF IAW/FEDERAL, STATE & LOCAL  
REGULATIONS.

=====  
Fire and Explosion Hazard Information  
=====

Flash Point Text: 600-650F

Extinguishing Media: WATER

Fire Fighting Procedures: USE WATER TO COOL SURFACES. OTHER TYPES OF  
EXTINGUISHERS MAY BE USED. USE NIOSH APPROVED SCBA IN ENCLOSED AREAS.  
STATIC

DISCHARGE CAN BE GENERATED. (SEE SUPP)

=====  
Control Measures  
=====

Respiratory Protection: NONE

Ventilation: NONE

Protective Gloves: NONE

Eye Protection: NONE

Other Protective Equipment: NONE

=====  
Physical/Chemical Properties  
=====

Solubility in Water: INSOLUBLE

Appearance and Odor: THIN SOLID FILM/SHEET W/NO ODOR.

=====  
Reactivity Data  
=====

Stability Indicator: YES

Stability Condition To Avoid: TEMP >572F.

Materials To Avoid: NONE

Hazardous Decomposition Products: CO<sub>2</sub>, HYDROGEN DIOXIDE & UNDER LEAN  
OXYGEN

CONDITIONS, CO.

Hazardous Polymerization Indicator: NO

=====  
Toxicological Information  
=====

=====  
Ecological Information  
=====

=====  
MSDS Transport Information  
=====

Regulatory Information

Other Information

HAZCOM Label

Product ID: POLYETHYLENE SHEETING/BAGS/LAWN EDGING

Cage: 66830

Company Name: POLY-AMERICA INC

Street: 2000 W MARSHALL DR

City: GRAND PRAIRIE TX

Zipcode: 75051-2795

Health Emergency Phone: 214-647-4374

Label Required IND: Y

Date Of Label Review: 12/16/1998

Status Code: C

Label Date: 12/16/1998

Origination Code: G

Hazard And Precautions: EYES: SOLID/DUST MAY CAUSE IRRITATION/CORNEAL INJURY.

SKIN: NEGLIGIBLE HAZARD. INHALATION: NEGLIGIBLE HAZARD AT AMBIENT TEMPERATURE. INGESTION: MINIMAL TOXICITY.

EYES: SOLID/DUST MAY CAUSE

IRRITATION/CORNEAL INJURY. SKIN: NEGLIGIBLE HAZARD. INHALATION: NEGLIGIBLE

HAZARD AT AMBIENT TEMP. INGESTION: MINIMAL TOXICITY.

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United States of America should seek competent professional advice to verify

and assume responsibility for the suitability of this information to their

particular situation regardless of similarity to a corresponding Department

of Defense or other government situation.

FIBERLOCK TECHNOLOGIES INC -- FIBERSET FT & FIBERSET PM, 7470

=====

MSDS Safety Information

=====

FSC: 8010  
MSDS Date: 03/29/1994  
MSDS Num: CFRTX  
LIIN: 00N049779  
Product ID: FIBERSET FT & FIBERSET PM, 7470  
MFN: 02  
Responsible Party  
Cage: 0JYL9  
Name: FIBERLOCK TECHNOLOGIES INC  
Address: 630 PUTNAM AVE  
City: CAMBRIDGE MA 02139-0802  
Info Phone Number: 617-876-8020  
Emergency Phone Number: 617-876-8020;800-255-3924  
Published: Y

=====

Contractor Summary

=====

Cage: 0JYL9  
Name: FIBERLOCK TECHNOLOGIES INC  
Address: 630 PUTNAM AVE  
Box: 390432  
City: CAMBRIDGE MA 02139-0802  
Phone: 617-876-8020

=====

Ingredients

=====

Name: NON-HAZARDOUS INGREDIENTS  
OSHA PEL: N/K (FP N)  
ACGIH TLV: N/K (FP N)

=====

Health Hazards Data

=====

LD50 LC50 Mixture: LD50:(ORAL,RAT) >5.0 G/KG  
Route Of Entry Inds - Inhalation: NO  
Skin: NO  
Ingestion: NO  
Carcinogenicity Inds - NTP: NO  
IARC: NO  
OSHA: NO  
Effects of Exposure: ACUTE: INHALATION: VAPORS OR SPRAY MISTS MAY BE SLIGHTLY IRRITATING TO EYES, NOSE, THROAT, AND MUCOUS MEMBRANE OF RESPIRATORY TRACT,  
PRODUCING SYMPTOMS OF HEADACHE AND NAUSEA IN POORLY VENTILATED AREAS. SKIN  
CONT: PROLONGED OR REPEATED CONT W/COATING MAY CAUSE SLIGHT SKIN IRRITATION.  
EYE CONT: DIRECT (EFTS OF OVEREXP)  
Explanation Of Carcinogenicity: NOT RELEVANT.  
Signs And Symptions Of Overexposure: HLTH HAZ: CONTACT; INCONSEQUENTIAL EYE IRRITATION. INGESTION: MAY CAUSE NAUSEA AND INTENDED EXPECTORATION.  
Medical Cond Aggravated By Exposure: NONE SPECIFIED BY MANUFACTURER.

First Aid: INHAL: REMOVE TO FRESH AIR. EYE CONT: IMMED FLUSH W/PLENTY OF WATER

FOR @ LST 15 MINS & CONSULT PHYS. SKIN CONT: WASH SKIN THOROUGHLY W/SOAP

& WATER. IF DRENCHED, REMOVE & WASH CLTHG BEFORE REUSE. ING EST: IF SWALLOWED, CALL PHYS IMMEDIATELY. NEVER GIVE ANYTHING BY MOUTH TO UNCONSCIOUS

PERSON. TREAT SYMPTOMATICALLY.

=====  
Handling and Disposal  
=====

Spill Release Procedures: KEEP UNNEC PEOPLE AWAY. FLOOR MAY BE SLIPPERY; USE

CARE TO AVOID FALLING. DIKE & CONTAIN MATL W/INERT MATL (E.G. SAND, EARTH). TRANSFER LIQUID TO CNTNRS FOR RECOVERY/DISP & SOLID DIKING MATL

TO SEPARAT E CNTNRS FOR DISP. KEEP SPILLS & CLEANING (SUPDAT)

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: COATING & ANY CONTAMD DIKING MATL SHOULD BE THORO

AIR DRIED & COLLECTED INTO DRUMS. DRUMS SHOULD THEN BE SEALED & PROPERLY LBLD W/WASTE DESIGNATION & LANDFILL/INCINERATED ACCORDING TO CURRENT LOCAL, S TATE AND FEDERAL REGULATIONS.

Handling And Storage Precautions: MAX STORAGE TEMP 100F. KEEP CLOSURE TIGHT

& CONTAINER UPRIGHT TO PREVENT LEAKAGE. PRECAUTIONARY LABELING: "KEEP FROM FREEZING".

Other Precautions: DO NOT GET IN EYES. AVOID SKIN CONT. PVNT PRLNGD/RPTD BRTHG

OF VAPS/SPRAY MISTS. DO NOT HNDL UNTIL MFR'S SAFETY PRECAUTIONS & LABEL

INSTRUCTIONS HAVE BEEN READ & UNDERSTOOD. AVOID BREATHING SANDING DU ST.

=====  
Fire and Explosion Hazard Information  
=====

Flash Point Text: NON-COMBUSTIBLE

Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).

Fire Fighting Procedures: USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard: NONE SPECIFIED BY MANUFACTURER.

=====  
Control Measures  
=====

Respiratory Protection: NONE REQD IF GOOD VENT IS MAINTAINED. WEAR RESP (NIOSH-APPRVD/EQUIV) SUITABLE FOR CONCS & TYPES OF AIR CONTAMINANTS ENCOUNTERED. USE NIOSH APPRVD CHEMICAL/MECHANICAL FILTERS DESIGNED TO REMOVE

PARTICU LATES IN OPEN & RESTRICTED VENT (SUPDAT)

Ventilation: SUFFICIENT VENT, IN PATTERN & VOL, SHOULD BE PROVIDED TO KEEP

AIR CONTAMINANT CONC BELOW APPLIC EXPOSURE LIMITS. (SUPDAT)

Protective Gloves: IMPERVIOUS/NEOPRENE/RUBBER GLOVES.

Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).

Other Protective Equipment: ANSI APPRVD EYE WASH & DELUGE SHOWER (FP N). USE

DISPOSABLE/IMPERVIOUS CLTHG IF WORK CLTHG CONTAM IS LIKELY. (SUPDAT)

Work Hygienic Practices: WASH HANDS BEFORE EATING, SMKNG/USING  
WASHROOM.

FOOD/BEVERAGES SHOULD NOT BE CONSUMED ANYWHERE THIS PROD IS (SUPDAT)  
Supplemental Safety and Health: SPILL PROC: RUN-OFFS OUT OF MUNICIPAL  
SEWERS

& OPEN BODIES OF WATER. RESP PROT: AREAS. USE NIOSH APPRVD AIRLINE  
TYPE

RESP/HOOD IN CONFINED AREAS. VENT: ALL APPLIC AREAS SHOULD BE  
VENTILATED

I/A/W OSHA REG 29CFR PART 1910.94. OTHER PROT EQUIP: USE PROT CREAM  
IF

PRLNGD SKIN CONT IS LIKELY. HYGIENE PRACT: BEING APPLIED.

=====

#### Physical/Chemical Properties

=====

B.P. Text: 212F,100C

M.P/F.P Text: >32F,>0C

Vapor Pres: 760 @ 100C

Vapor Density: HVR/AIR

Spec Gravity: 1.02 (FP N)

Evaporation Rate & Reference: SLOWER (BUTYL ACETATE =1)

Solubility in Water: COMPLETE

Appearance and Odor: LIQUID, SLIGHT ODOR.

=====

#### Reactivity Data

=====

Stability Indicator: YES

Stability Condition To Avoid: NONE SPECIFIED BY MANUFACTURER.

Materials To Avoid: AVOID CONTACT WITH: STRONG OXIDIZING AGENTS (E.G.  
NITRIC

ACID, PERMANGANATES), ETC.

Hazardous Decomposition Products: SOME CARBON MONOXIDE.

Hazardous Polymerization Indicator: NO

Conditions To Avoid Polymerization: NOT RELEVANT.

=====

#### Toxicological Information

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#### Ecological Information

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#### MSDS Transport Information

=====

#### Regulatory Information

=====

#### Other Information

=====

#### HAZCOM Label

=====

Product ID: FIBERSET FT & FIBERSET PM, 7470

Cage: 0JYL9

Company Name: FIBERLOCK TECHNOLOGIES INC

Street: 630 PUTNAM AVE

PO Box: 390432



City: CAMBRIDGE MA  
Zipcode: 02139-0802  
Health Emergency Phone: 617-876-8020;800-255-3924  
Label Required IND: Y  
Date Of Label Review: 11/25/1997  
Status Code: C  
Label Date: 11/25/1997  
Origination Code: G  
Eye Protection IND: YES  
Skin Protection IND: YES  
Signal Word: CAUTION  
Respiratory Protection IND: YES  
Health Hazard: Slight  
Contact Hazard: Slight  
Fire Hazard: None  
Reactivity Hazard: None  
Hazard And Precautions: ACUTE: INHALATION: VAPORS OR SPRAY MISTS MAY BE  
SLIGHTLY IRRITATING TO EYES, NOSE, THROAT, AND MUCOUS MEMBRANE OF  
RESPIRATORY  
TRACT, PRODUCING SYMPTOMS OF HEADACHE AND NAUSEA IN POORLY VENTILATED  
AREA S.  
SKIN CONT: PROLONGED OR REPEATED CONTACT WITH COATING MAY CAUSE  
SLIGHT SKIN  
IRRITATION. EYE CONT: DIRECT CONTACT; INCONSEQUENTIAL EYE IRRITATION.  
INGESTION: MAY CAUSE NAUSEA AND INTENDED EXPECTORAT ION. CHRONIC:  
NONE LISTED  
BY MANUFACTURER.

=====

Disclaimer (provided with this information by the compiling agencies):  
This  
information is formulated for use by elements of the Department of  
Defense.  
The United States of America in no manner whatsoever expressly or  
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warrants, states, or intends said information to have any  
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United States of America should seek competent professional advice to  
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and assume responsibility for the suitability of this information to  
their  
particular situation regardless of similarity to a corresponding  
Department  
of Defense or other government situation.

## **APPENDIX C**

### **STANDARD OPERATING PROCEDURES (SOP) FOR SURFACE SOIL AND SUB-SURFACE SOIL SAMPLE COLLECTION**

# **LIST OF STANDARD OPERATING PROCEDURES (SOP) FOR SURFACE SOIL AND SUBSURFACE SOIL SAMPLE COLLECTION**

SOP/Form Number	Title	Key words
HF-SOP-2	Determination, Identification, and Description of Field Sampling Sites	Sampling
HF-SOP-4	Packing and Shipping Samples	Sampling
HF-SOP-5	Chain-of-Custody	Documentation
HF-SOP-7	Decontamination of Sampling Equipment	Decontamination
HF-SOP-29	Labeling and Documentation of Samples	Documentation
HF-SOP-31	Field Notebooks	Documentation
HF-SOP-58	Management and Validation of Field and Laboratory Data	Documentation
HS-SOP-6	Procedure For Collecting Surface Soil Samples	Soil
HS-SOP-13	Rinsate Blank Collection	Sampling
HS-SOP-57	Soil Sampling Procedure For Test Pits	Soil

## **APPENDIX D**

### **FUMED SLAG ANALYTICAL DATA**

## ANALYTICAL SUMMARY REPORT

May 02, 2005

Iver Johnson

MT DEQ

PO Box 200901

Helena, MT 59620

COPY

RECEIVED

MAY 05 2005

Dept. of Enviro. Quality  
Waste & Underground  
Tank Management Bureau

Workorder No.: H05040130

Project Name: ASARCO Slag Pile

Energy Laboratories Inc received the following 10 samples from MT DEQ on 4/14/2005 for analysis.

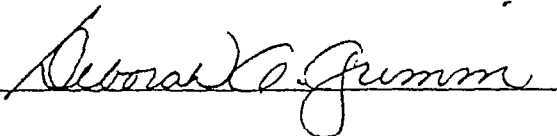
Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H05040130-001	ASP01-B3	04/14/05 14:15	04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-002	ASP02-B5	04/14/05 14:21	04/14/05	Solid	Same As Above
H05040130-003	ASP03-B14	04/14/05 14:28	04/14/05	Solid	Metals by ICP/ICPMS, Total Chloride, Sulfate Mercury in Solid By CVAA Moisture Moisture Polychlorinated Biphenyls (PCB's) pH Digestion, Total Metals Digestion, Mercury by CVAA Saturated Paste Extraction Sonication Extraction Soil Sonication Extraction Semi-Volatile Organic Compounds, PAHs Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List
H05040130-004	ASP04-C4	04/14/05 14:37	04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-005	ASP05-C9	04/14/05 14:44	04/14/05	Solid	Metals by ICP/ICPMS, Total Chloride, Sulfate Mercury in Solid By CVAA Moisture Moisture Polychlorinated Biphenyls (PCB's) pH Digestion, Total Metals Digestion, Mercury by CVAA Saturated Paste Extraction Sonication Extraction Soil Sonication Extraction Semi-Volatile Organic Compounds, PAHs Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List

H05040130-006	ASP06-D16	04/14/05 14:50 04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-007	ASP07-F3	04/14/05 14:57 04/14/05	Solid	Same As Above
H05040130-008	ASP08-G2	04/14/05 15:04 04/14/05	Solid	Metals by ICP/ICPMS, Total Chloride, Sulfate Mercury in Solid By CVAA Moisture Moisture Polychlorinated Biphenyls (PCB's) pH Digestion, Total Metals Digestion, Mercury by CVAA Saturated Paste Extraction Sonication Extraction Soil Sonication Extraction Semi-Volatile Organic Compounds, PAHs Volatile Organics, Methanol Extraction 8260-Volatile Organic Compounds - Short List
H05040130-009	ASP09-G4	04/14/05 15:07 04/14/05	Solid	Metals by ICP/ICPMS, Total Mercury in Solid By CVAA Digestion, Total Metals Digestion, Mercury by CVAA
H05040130-010	ASP10-H16	04/14/05 15:15 04/14/05	Solid	Same As Above

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative or Report.

If you have any questions regarding these tests results, please call.

Report Approved By:



## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-001  
Client Sample ID: ASP01-B3

Report Date: 05/02/05  
Collection Date: 04/14/05 14:15  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	34.9	mg/kg		5.0		SW6020	04/27/05 00:49 / rth
Arsenic	130	mg/kg		5.0		SW6020	04/27/05 00:49 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 03:48 / jjw
Cadmium	3.1	mg/kg		1.0		SW6010B	04/20/05 19:24 / jjw
Chromium	60.8	mg/kg		5.0		SW6010B	04/20/05 19:24 / jjw
Cobalt	164	mg/kg		5.0		SW6010B	04/20/05 19:24 / jjw
Iron	196000	mg/kg	D	40		SW6010B	04/20/05 19:28 / jjw
Lead	134	mg/kg		5.0		SW6010B	04/20/05 19:28 / jjw
Manganese	11400	mg/kg		5.0		SW6010B	04/22/05 03:48 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 13:51 / KC
Nickel	8.4	mg/kg		5.0		SW6010B	04/20/05 19:24 / jjw
Phosphorus	652	mg/kg		10		SW6010B	04/22/05 03:48 / jjw
Selenium	6.4	mg/kg		5.0		SW6020	04/27/05 00:49 / rth
Zinc	13200	mg/kg		5.0		SW6010B	04/20/05 19:28 / jjw

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-002  
 Client Sample ID: ASP02-B5

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:21  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	46.7	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Arsenic	135	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 03:51 / jjw
Cadmium	4.1	mg/kg		1.0		SW6010B	04/20/05 19:32 / jjw
Chromium	59.4	mg/kg		5.0		SW6010B	04/20/05 19:32 / jjw
Cobalt	207	mg/kg		5.0		SW6010B	04/20/05 19:32 / jjw
Iron	243000	mg/kg	D	80		SW6010B	04/22/05 03:51 / jjw
Lead	140	mg/kg		5.0		SW6010B	04/20/05 19:32 / jjw
Manganese	11700	mg/kg		5.0		SW6010B	04/22/05 03:51 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 13:57 / KC
Nickel	20.4	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Phosphorus	584	mg/kg		10		SW6010B	04/22/05 03:51 / jjw
Selenium	8.5	mg/kg		5.0		SW6020	04/27/05 00:56 / rth
Zinc	16900	mg/kg		5.0		SW6010B	04/22/05 03:51 / jjw

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-003  
 Client Sample ID: ASP03-B14

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:28  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	0.500	wt%		0.0100		SW3550A	04/22/05 08:15 / MC
CHEMICAL CHARACTERISTICS							
pH, 1:2	8.6	s.u.		0.1		ASA10-3	04/25/05 16:18 / srm
Chloride, 1:2	1.99	mg/kg		1.00		ASA10-3	04/26/05 11:49 / qed
METALS, TOTAL							
Antimony	33.7	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Arsenic	118	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Beryllium	ND	mg/kg		5.0		SW6010S	04/22/05 04:02 / jjw
Cadmium	2.6	mg/kg		1.0		SW6010S	04/20/05 19:35 / jjw
Chromium	67.1	mg/kg		5.0		SW6010S	04/20/05 19:35 / jjw
Cobalt	117	mg/kg		5.0		SW6010S	04/20/05 19:35 / jjw
Iron	264000	mg/kg	D	80		SW6010S	04/22/05 04:02 / jjw
Lead	63.8	mg/kg		5.0		SW6010S	04/20/05 19:35 / jjw
Manganese	13200	mg/kg		5.0		SW6010S	04/22/05 04:02 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 13:59 / KC
Nickel	14.5	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Phosphorus	612	mg/kg		10		SW6010S	04/22/05 04:02 / jjw
Selenium	8.4	mg/kg		5.0		SW6020	04/27/05 01:03 / rth
Zinc	13500	mg/kg		5.0		SW6010S	04/22/05 04:02 / jjw
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Benzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromochloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromodichloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Bromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Carbon tetrachloride	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chlorobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chloroethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
2-Chloroethyl vinyl ether	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chloroform	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chloromethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
2-Chlorotoluene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
4-Chlorotoluene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Chlorodibromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
1,2-Dibromoethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
Dibromomethane	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr
1,2-Dichlorobenzene	ND	mg/kg		0.20		SW8260S	04/21/05 16:42 / trr

Report RL - Analyte reporting limit.

MCL - Maximum contaminant level.

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-003  
Client Sample ID: ASP03-B14

Report Date: 05/02/05  
Collection Date: 04/14/05 14:28  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
VOLATILE ORGANIC COMPOUNDS							
1,3-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,4-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Dichlorodifluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,2-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,3-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
2,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
cis-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
trans-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Ethylbenzene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Methyl tert-butyl ether (MTBE)	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Methylene chloride	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Methyl ethyl ketone	ND	mg/kg		4.0		SW8260B	04/21/05 16:42 / trr
Styrene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,1,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Tetrachloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Toluene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,1-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,1,2-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Trichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Trichlorofluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
1,2,3-Trichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Vinyl chloride	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
m+p-Xylenes	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
o-Xylene	ND	mg/kg		0.20		SW8260B	04/21/05 16:42 / trr
Surr: p-Bromofluorobenzene	134	%REC			78-160	SW8260B	04/21/05 16:42 / trr
Surr: Dibromofluoromethane	116	%REC			70-132	SW8260B	04/21/05 16:42 / trr
Surr: 1,2-Dichloroethane-d4	114	%REC			60-136	SW8260B	04/21/05 16:42 / trr
Surr: Toluene-d8	126	%REC			75-138	SW8260B	04/21/05 16:42 / trr
SEMI-VOLATILE ORGANIC COMPOUNDS							
Acenaphthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Acenaphthylene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Benzo(a)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-003  
 Client Sample ID: ASP03-B14

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:28  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Benzo(a)pyrene	ND	mg/kg		0.33		SWS270C	04/21/05 13:56 / sm
Benzo(b)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Benzo(g,h,i)perylene	ND	mg/kg		0.33		SWS270C	04/21/05 13:56 / sm
Benzo(k)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Chrysene	ND	mg/kg		0.33		SWS270C	04/21/05 13:56 / sm
Dibenzo(a,h)anthracene	ND	mg/kg		0.33		SWS270C	04/21/05 13:56 / sm
Fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Fluorene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Naphthalene	ND	mg/kg		0.33		SWS270C	04/21/05 13:56 / sm
Phenanthrene	ND	mg/kg		0.33		SWS270C	04/21/05 13:56 / sm
Pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 13:56 / sm
Surr: 2-Fluorobiphenyl	82.5	%REC			30-115	SWS270C	04/21/05 13:56 / sm
Surr: Nitrobenzene-d5	83.7	%REC			23-120	SWS270C	04/21/05 13:56 / sm
Surr: Terphenyl-d14	95.6	%REC			15-137	SW8270C	04/21/05 13:56 / sm
POLYCHLORINATED BIPHENYLS (PCB'S)							
Aroclor 1016	ND	mg/kg		0.017		SWS002	04/24/05 03:13 / law
Aroclor 1221	ND	mg/kg		0.017		SW9302	04/24/05 03:13 / law
Aroclor 1232	ND	mg/kg		0.017		SW8002	04/24/05 03:13 / law
Aroclor 1242	ND	mg/kg		0.017		SW8002	04/24/05 03:13 / law
Aroclor 1248	ND	mg/kg		0.017		SW9002	04/24/05 03:13 / law
Aroclor 1254	ND	mg/kg		0.017		SW8002	04/24/05 03:13 / law
Aroclor 1260	ND	mg/kg		0.017		SW8002	04/24/05 03:13 / law
Aroclor 1262	ND	mg/kg		0.017		SW8002	04/24/05 03:13 / law
Aroclor 1268	ND	mg/kg		0.017		SW8002	04/24/05 03:13 / law
Surr: Decachlorobiphenyl	96.0	%REC			50-126	SW8002	04/24/05 03:13 / law
Surr: Tetrachloro-m-xylene	86.0	%REC			42-115	SW8002	04/24/05 03:13 / law
Sample extract received a Sulfuric Acid Clean-up (EPA Method 3665) and a Sulfur Clean-up (EPA Method 3650) prior to analysis							

Report RL - Analyte reporting limit.  
 Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-004  
 Client Sample ID: ASP04-C4

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:37  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	43.5	mg/kg		5.0		SW6020	04/27/05 01:10 / rlh
Arsenic	155	mg/kg		5.0		SW6020	04/27/05 01:10 / rlh
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:06 / jjw
Cadmium	5.1	mg/kg		1.0		SW6010B	04/20/05 19:39 / jjw
Chromium	71.2	mg/kg		5.0		SW6010B	04/20/05 19:39 / jjw
Cobalt	212	mg/kg		5.0		SW6010B	04/20/05 19:39 / jjw
Iron	273000	mg/kg	D	80		SW6010B	04/22/05 04:06 / jjw
Lead	364	mg/kg		5.0		SW6010B	04/20/05 19:39 / jjw
Manganese	12200	mg/kg		5.0		SW6010B	04/22/05 04:06 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:01 / KC
Nickel	22.9	mg/kg		5.0		SW6020	04/27/05 01:10 / rlh
Phosphorus	586	mg/kg		10		SW6010B	04/22/05 04:06 / jjw
Selenium	12.1	mg/kg		5.0		SW6020	04/27/05 01:10 / rlh
Zinc	17900	mg/kg		5.0		SW5010B	04/22/05 04:06 / jjw

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-005  
 Client Sample ID: ASP05-C9

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:44  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	0.800	wt%		0.0100		SW3550A	04/22/05 08:15 / MC
CHEMICAL CHARACTERISTICS							
pH, 1:2	9.0	s.u.		0.1		ASA10-3	04/25/05 16:18 / srm
Chloride, 1:2	2.89	mg/kg		1.00		ASA10-3	04/26/05 12:13 / qed
METALS, TOTAL							
Antimony	37.1	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Arsenic	117	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:13 / jjw
Cadmium	3.1	mg/kg		1.0		SW6010B	04/20/05 19:42 / jjw
Chromium	74.4	mg/kg		5.0		SW6010B	04/20/05 19:42 / jjw
Cobalt	153	mg/kg		5.0		SW6010B	04/20/05 19:42 / jjw
Iron	252000	mg/kg	D	80		SW6010B	04/22/05 04:13 / jjw
Lead	160	mg/kg		5.0		SW6010B	04/20/05 19:42 / jjw
Manganese	11300	mg/kg		5.0		SW6010B	04/22/05 04:13 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:04 / KC
Nickel	15.9	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Phosphorus	707	mg/kg		10		SW6010B	04/22/05 04:13 / jjw
Selenium	12.7	mg/kg		5.0		SW6020	04/27/05 01:44 / rth
Zinc	12500	mg/kg		5.0		SW6010B	04/22/05 04:13 / jjw
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Benzene	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Bromobenzene	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Bromochloromethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Bromodichloromethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Bromomethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Carbon tetrachloride	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Chlorobenzene	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Chloroethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
2-Chloroethyl vinyl ether	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Chloroform	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Chloromethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
2-Chlorotoluene	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
4-Chlorotoluene	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Chlorodibromomethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
1,2-Dibromoethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
Dibromomethane	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr
1,2-Dichlorobenzene	ND	mg/kg		0.20		SW8250B	04/21/05 17:16 / trr

Report RL - Analyte reporting limit.

MCL - Maximum contaminant level

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit

D - RL increased due to sample matrix interference.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
Project: ASARCO Slag Pile  
Lab ID: H05040130-005  
Client Sample ID: ASP05-C9

Report Date: 05/02/05  
Collection Date: 04/14/05 14:44  
Date Received: 04/14/05  
Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
VOLATILE ORGANIC COMPOUNDS							
1,3-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,4-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Dichlorodifluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,2-Dichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,3-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
2,2-Dichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
cis-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
trans-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Ethylbenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Methyl tert-butyl ether (MTBE)	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Methylene chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Methyl ethyl ketone	ND	mg/kg		4.0		SW8260B	04/21/05 17:16 / trr
Styrene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1,1,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Tetrachloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Toluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1,1-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,1,2-Trichloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Trichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Trichlorofluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
1,2,3-Trichloropropane	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Vinyl chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
m+p-Xylenes	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
o-Xylene	ND	mg/kg		0.20		SW8260B	04/21/05 17:16 / trr
Surr: p-Bromofluorobenzene	118	%REC			78-160	SW8260B	04/21/05 17:16 / trr
Surr: Dibromofluoromethane	104	%REC			70-132	SW8260B	04/21/05 17:16 / trr
Surr: 1,2-Dichloroethane-d4	104	%REC			60-136	SW8260B	04/21/05 17:16 / trr
Surr: Toluene-d8	104	%REC			75-138	SW8260B	04/21/05 17:16 / trr
SEMI-VOLATILE ORGANIC COMPOUNDS							
Acenaphthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Acenaphthylene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo(a)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-005  
 Client Sample ID: ASP05-C9

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:44  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
SEMI-VOLATILE ORGANIC COMPOUNDS							
Benzo(a)pyrene	ND	mg/kg		0.33		SWS270C	04/21/05 14:39 / sm
Benzo(b)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo(g,h,i)perylene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Benzo(k)fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Chrysene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Dibenzo(a,h)anthracene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Fluoranthene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Fluorene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Naphthalene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Phenanthrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Pyrene	ND	mg/kg		0.33		SW8270C	04/21/05 14:39 / sm
Surr: 2-Fluorobiphenyl	68.6	%REC			30-115	SWS270C	04/21/05 14:39 / sm
Surr: Nitrobenzene-d5	86.9	%REC			23-120	SW8270C	04/21/05 14:39 / sm
Surr: Terphenyl-d14	98.9	%REC			16-137	SW8270C	04/21/05 14:39 / sm
POLYCHLORINATED BIPHENYLS (PCB'S)							
Aroclor 1016	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1221	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1232	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1242	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1248	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1254	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1250	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1262	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Aroclor 1268	ND	mg/kg		0.017		SW8082	04/24/05 03:40 / law
Surr: Decachlorobiphenyl	140	%REC	S		50-126	SW8082	04/24/05 03:40 / law
Surr: Tetrachloro-m-xylene	108	%REC			42-115	SW8082	04/24/05 03:40 / law
Sample extract received a Sulfuric Acid Clean-up (EPA Method 3555) and a Sulfur Clean-up (EPA Method 3660) prior to analysis.							

Sample extract received a Sulfuric Acid Clean-up (EPA Method 3555) and a Sulfur Clean-up (EPA Method 3660) prior to analysis.

Report  
 Definitions: RL - Analyte reporting limit.  
 QCL - Quality control limit.  
 S - Spike recovery outside of advisory limits.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-006  
 Client Sample ID: ASP06-D16

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:50  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	42.5	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Arsenic	130	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:17 / jjw
Cadmium	2.2	mg/kg		1.0		SW6010B	04/20/05 19:46 / jjw
Chromium	68.4	mg/kg		5.0		SW6010B	04/20/05 19:46 / jjw
Cobalt	173	mg/kg		5.0		SW6010B	04/20/05 19:46 / jjw
Iron	305300	mg/kg	D	80		SW6010B	04/22/05 04:17 / jjw
Lead	55.5	mg/kg		5.0		SW6010B	04/20/05 19:46 / jjw
Manganese	11800	mg/kg		5.0		SW6010B	04/22/05 04:17 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:06 / KC
Nickel	18.8	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Phosphorus	647	mg/kg		10		SW6010B	04/22/05 04:17 / jjw
Selenium	11.0	mg/kg		5.0		SW6020	04/27/05 01:51 / rth
Zinc	19100	mg/kg		5.0		SW6010B	04/22/05 04:17 / jjw

Report Definitions: RL - Analyte reporting limit.  
 QCL - Quality control limit.  
 D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.



# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-007  
 Client Sample ID: ASP07-F3

Report Date: 05/02/05  
 Collection Date: 04/14/05 14:57  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	42.7	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Arsenic	102	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:20 / jjw
Cadmium	1.9	mg/kg		1.0		SW6010B	04/20/05 19:49 / jjw
Chromium	70.5	mg/kg		5.0		SW6010B	04/20/05 19:49 / jjw
Cobalt	171	mg/kg		5.0		SW6010B	04/20/05 19:49 / jjw
Iron	286000	mg/kg	D	80		SW6010B	04/22/05 04:20 / jjw
Lead	45.3	mg/kg		5.0		SW6010B	04/20/05 19:49 / jjw
Manganese	12100	mg/kg		5.0		SW6010B	04/22/05 04:20 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:10 / KC
Nickel	17.4	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Phosphorus	578	mg/kg		10		SW6010B	04/22/05 04:20 / jjw
Selenium	13.8	mg/kg		5.0		SW6020	04/27/05 01:58 / rth
Zinc	19100	mg/kg		5.0		SW6010B	04/22/05 04:20 / jjw

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit

## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-008  
 Client Sample ID: ASP08-G2

Report Date: 05/02/05  
 Collection Date: 04/14/05 15:04  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	0.600	wt%		0.0100		SW3550A	04/22/05 08:15 / MC
CHEMICAL CHARACTERISTICS							
pH, 1:2	9.2	s.u.		0.1		ASA10-3	04/25/05 16:16 / srm
Chloride, 1:2	1.06	mg/kg		1.00		ASA10-3	04/26/05 12:48 / qed
METALS, TOTAL							
Antimony	43.6	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Arsenic	119	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:24 / jjw
Cadmium	2.5	mg/kg		1.0		SW6010B	04/20/05 20:00 / jjw
Chromium	59.6	mg/kg		5.0		SW6010B	04/20/05 20:00 / jjw
Cobalt	194	mg/kg		5.0		SW6010B	04/20/05 20:00 / jjw
Iron	290000	mg/kg	D	60		SW6010B	04/22/05 04:24 / jjw
Lead	116	mg/kg		5.0		SW6010B	04/20/05 20:00 / jjw
Manganese	13100	mg/kg		5.0		SW6010B	04/22/05 04:24 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:12 / KC
Nickel	17.9	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Phosphorus	720	mg/kg		10		SW6010B	04/22/05 04:24 / jjw
Selenium	9.9	mg/kg		5.0		SW6020	04/27/05 02:05 / rth
Zinc	21100	mg/kg		5.0		SW6010B	04/22/05 04:24 / jjw
VOLATILE ORGANIC COMPOUNDS							
Bromoform	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Benzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromochloromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromodichloromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Bromomethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Carbon tetrachloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chloroethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
2-Chloroethyl vinyl ether	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chloroform	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chloromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
2-Chlorotoluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
4-Chlorotoluene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Chlorodibromomethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2-Dibromoethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Dibromomethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2-Dichlorobenzene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr

Report RL - Analyte reporting limit.

MCL - Maximum contaminant level.

Definitions: QCL - Quality control limit.

ND - Not detected at the reporting limit.

D - RL increased due to sample matrix interference.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-008  
 Client Sample ID: ASP08-G2

Report Date: 05/02/05  
 Collection Date: 04/14/05 15:04  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
VOLATILE ORGANIC COMPOUNDS							
1,3-Dichlorobenzene	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
1,4-Dichlorobenzene	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
Dichlorodifluoromethane	ND	mg/kg		0.20		SW3260B	04/21/05 17:51 / trr
1,1-Dichloroethane	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
1,2-Dichloroethane	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
cis-1,2-Dichloroethene	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
1,1-Dichloroethene	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
trans-1,2-Dichloroethene	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
1,2-Dichloropropane	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
1,3-Dichloropropane	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
2,2-Dichloropropane	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
1,1-Dichloropropene	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
cis-1,3-Dichloropropene	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
trans-1,3-Dichloropropene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Ethylbenzene	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
Methyl tert-butyl ether (MTBE)	ND	mg/kg		0.20		SW3260B	04/21/05 17:51 / trr
Methylene chloride	ND	mg/kg		0.20		SW3260B	04/21/05 17:51 / trr
Methyl ethyl ketone	ND	mg/kg		4.0		SW8260B	04/21/05 17:51 / trr
Styrene	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
1,1,1,2-Tetrachloroethane	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
1,1,2,2-Tetrachloroethane	ND	mg/kg		0.20		SWS260B	04/21/05 17:51 / trr
Tetrachloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Toluene	ND	mg/kg		0.20		SW3260B	04/21/05 17:51 / trr
1,1,1-Trichloroethane	ND	mg/kg		0.20		SW6260B	04/21/05 17:51 / trr
1,1,2-Trichloroethane	ND	mg/kg		0.20		SW3260B	04/21/05 17:51 / trr
Trichloroethene	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
Trichlorofluoromethane	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
1,2,3-Trichloropropane	ND	mg/kg		0.20		SW3260B	04/21/05 17:51 / trr
Vinyl chloride	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
m+p-Xylenes	ND	mg/kg		0.20		SW8260B	04/21/05 17:51 / trr
o-Xylene	ND	mg/kg		0.20		SW260B	04/21/05 17:51 / trr
Surr: p-Bromofluorobenzene	116	%REC			75-160	SW3260B	04/21/05 17:51 / trr
Surr: Dibromofluoromethane	105	%REC			70-132	SW3260B	04/21/05 17:51 / trr
Surr: 1,2-Dichloroethane-d4	102	%REC			60-135	SW3260B	04/21/05 17:51 / trr
Surr: Toluene-d8	105	%REC			75-138	SW3260B	04/21/05 17:51 / trr
SEMI-VOLATILE ORGANIC COMPOUNDS							
Acenaphthene	ND	mg/kg		0.33		SW3270C	04/21/05 15:21 / sm
Acenaphthylene	ND	mg/kg		0.33		SW2270C	04/21/05 15:21 / sm
Anthracene	ND	mg/kg		0.33		SW2270C	04/21/05 15:21 / sm
Benzo[a]anthracene	ND	mg/kg		0.33		SW2270C	04/21/05 15:21 / sm

Report RL - Analyte reporting limit.  
 Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-008  
 Client Sample ID: ASP08-G2

Report Date: 05/02/05  
 Collection Date: 04/14/05 15:04  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>						
Benzo(a)pyrene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Benzo(b)fluoranthene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Benzo(g,h,i)perylene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Benzo(k)fluoranthene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Chrysene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Dibenzo(a,h)anthracene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Fluoranthene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Fluorene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Naphthalene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Phenanthrene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Pyrene	ND	mg/kg		0.33	SW8270C	04/21/05 15:21 / sm
Surr: 2-Fluorobiphenyl	75.9	%REC		30-115	SW8270C	04/21/05 15:21 / sm
Surr: Nitrobenzene-d5	76.0	%REC		23-120	SW8270C	04/21/05 15:21 / sm
Surr: Terphenyl-d14	88.9	%REC		18-137	SW8270C	04/21/05 15:21 / sm
<b>POLYCHLORINATED BIPHENYLS (PCB'S)</b>						
Aroclor 1016	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1221	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1232	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1242	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1248	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1254	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1260	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1262	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Aroclor 1268	ND	mg/kg		0.017	SW8082	04/24/05 04:08 / law
Surr: Decachlorobiphenyl	125	%REC		50-126	SW8082	04/24/05 04:08 / law
Surr: Tetrachloro-m-xylene	90.0	%REC		42-115	SW8082	04/24/05 04:08 / law

Sample extract received a Sulfuric Acid Clean-up (EPA Method 3655) and a Sulfur Clean-up (EPA Method 3650) prior to analysis.

Report Definitions: RL - Analyte reporting limit.  
 QCL - Quality control limit.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

# LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-009  
 Client Sample ID: ASP09-G4

Report Date: 05/02/05  
 Collection Date: 04/14/05 15:07  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	57.6	mg/kg		5.0		SW6020	04/27/05 02:12 / rlh
Arsenic	109	mg/kg		5.0		SW6020	04/27/05 02:12 / rlh
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:27 / jjw
Cadmium	1.4	mg/kg		1.0		SW6010B	04/20/05 20:04 / jjw
Chromium	90.0	mg/kg		5.0		SW6010B	04/20/05 20:04 / jjw
Cobalt	204	mg/kg		5.0		SW6010B	04/20/05 20:04 / jjw
Iron	294000	mg/kg	D	80		SW6010B	04/22/05 04:27 / jjw
Lead	64.0	mg/kg		5.0		SW6010B	04/20/05 20:04 / jjw
Manganese	11900	mg/kg		5.0		SW6010B	04/22/05 04:27 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:14 / KC
Nickel	20.6	mg/kg		5.0		SW6020	04/27/05 02:12 / rlh
Phosphorus	562	mg/kg		10		SW6010B	04/22/05 04:27 / jjw
Selenium	12.2	mg/kg		5.0		SW6020	04/27/05 02:12 / rlh
Zinc	20100	mg/kg		5.0		SW6010B	04/22/05 04:27 / jjw

Report  
 Definitions: RL - Analyte reporting limit.  
 OCL - Quality control limit.  
 D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

## LABORATORY ANALYTICAL REPORT

Client: MT DEQ  
 Project: ASARCO Slag Pile  
 Lab ID: H05040130-010  
 Client Sample ID: ASP10-H16

Report Date: 05/02/05  
 Collection Date: 04/14/05 15:15  
 Date Received: 04/14/05  
 Matrix: Solid

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
Antimony	34.1	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Arsenic	117	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Beryllium	ND	mg/kg		5.0		SW6010B	04/22/05 04:31 / jjw
Cadmium	2.1	mg/kg		1.0		SW6010B	04/20/05 20:07 / jjw
Chromium	59.0	mg/kg		5.0		SW6010B	04/20/05 20:07 / jjw
Cobalt	137	mg/kg		5.0		SW6010B	04/20/05 20:07 / jjw
Iron	305000	mg/kg	D	80		SW6010B	04/22/05 04:31 / jjw
Lead	103	mg/kg		5.0		SW6010B	04/20/05 20:07 / jjw
Manganese	10400	mg/kg		5.0		SW6010B	04/22/05 04:31 / jjw
Mercury	ND	mg/kg		1.0		SW7471A	04/25/05 14:16 / KC
Nickel	14.7	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Phosphorus	710	mg/kg		10		SW6010B	04/22/05 04:31 / jjw
Selenium	9.1	mg/kg		5.0		SW6020	04/22/05 05:23 / rlh
Zinc	22200	mg/kg		5.0		SW6010B	04/22/05 04:31 / jjw

Report RL - Analyte reporting limit.  
 Definitions: QCL - Quality control limit.  
 D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.

## **APPENDIX 4-1-2**

### **SUMMARY OF SLAG TESTING ANALYSES INCLUDING TEST BASIN WATER QUALITY, SLAG BOTTLE ROLL TESTS AND EP TOXICITY TESTS**

OF 2000 LITER BOTTLE ANALYSES - ASARCO EAST HELENA

SITE NAME	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG	FUMED SLAG
SAMPLE DATE	12/30/86	04/02/87	04/22/87	04/22/87	05/22/87	05/22/87	05/22/87	05/22/87	07/15/87	07/15/87
LAP	ASARCO	ASARCO	ASARCO	CHMTC	ASARCO	ASARCO	CHMTC	CHMTC	ASARCO	ASARCO
REMARKS	BOTTLE			SPLIT	REPLICATE		SPLIT	REPLICATE	REPLICATE	
SAMPLE NUMBER	ROLL TEST	8704-1	8704-20		8705-50	8705-47			8707-02	8707-01
<b>PHYSICAL PARAMETERS</b>										
WATER TEMPERATURE (C)			7.5			9.7				
SPEC. COND. (UMHOS/CM) FIELD			2235		2268	2265			2137	2150
SPEC. COND. (UMHOS/CM) LAB	115	1950	2250			2320				2400
PH FIELD			6.16 *		7.48	7.69				7.46
PH LAB	9.9	7.77	6.81			7.52				7.55
TDS MEAS. @ 180 DEG. C	94	1842	1903 *	993		2086	2227			1912 *
OXYGEN (O) DISS			4.3			4.3				4.1
DEPTH TO SWL BELOW MP (FT)			8.74 *			8.01				
<b>COMMON IONS</b>										
CALCIUM (CA)	12	510	454	449.0		422	417.0	412.0		321
MAGNESIUM (MG)	0.49	20	25.5	27.40		20.2	25.10	24.90		22.9
SODIUM (NA)	5.1	76	71.5	76.6		85	72.5	71.8		74
POTASSIUM (K)	3.9	54	65	60.80		74	136.00	122.00		68
BICARBONATE (HCO3) (LAB)	11.0	260 *	102			98				84
CARBONATE AS CO3 (LAB)	19	11	11			11				11.0
SULFATE (SO4)	10	1450	1425	1240.0		1338	1304.0			1200
CHLORIDE (CL)	18	6.0	7.0	10.0		7.0	30.0			4.0
<b>TRACE ELEMENTS</b>										
ARSENIC (AS) DISS	0.19	0.0325	0.0283	0.0198	0.038	0.030	0.0530	0.0320	0.057 *	0.039 *
ARSENIC (AS) +3			0.014						0.0214	0.060 *
ARSENIC (AS) +5			0.010						0.0722 *	0.0268
CADMIUM (CD) DISS	0.003	0.075	0.060	0.0720	0.051	0.051	0.0520	0.0500	0.055	0.049
COFFER (CU) DISS	0.009	0.280 *	0.193	0.2260	0.125	0.128	0.1480	0.1340	0.118	0.110
IRON (FE) DISS	0.11	0.020	0.020	0.100	0.044	0.045	0.100	0.100	0.020	0.020
IRON (FE II)			0.010 *						0.060	0.080
LEAD (PB) DISS	0.017	0.045 *	0.030 *	0.0334	0.019	0.020	0.0323	0.0432	0.016	0.021
MANGANESE (MN) DISS	0.017	1.080	1.440	2.640	1.910	1.930	2.660	2.640	2.930	2.890
ZINC (ZN) DISS	0.023	3.580	3.700	4.450	2.830	2.890	2.860	2.820	2.500	2.300

All quantities in milligrams per liter unless otherwise noted. Blank line indicates parameter not tested.

Output Date: 03-19-1987  
HWQ-6/86-K1



SLAG WATER QUALITY ANALYSES - ASARCO EAST HELENA

SITE NAME	FUMED SLAG	FUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG	UNFUMED SLAG
SAMPLE DATE	02/22/87	02/22/87	12/30/86	04/22/87	04/22/87	05/22/87	05/22/87	07/15/87	09/22/87
LAB	ASARCO	ASARCO	ASARCO	ASARCO	CHMTC	CHMTC	ASARCO	ASARCO	ASARCO
REMARKS	REPLICATE		BOTTLE		SPLIT	SPLIT			
SAMPLE NUMBER	8709-04	8709-04		8704-24			8705-43	8707-03	8709-07
PHYSICAL PARAMETERS									
WATER TEMPERATURE (C)		16 *		10.5			10.9		17 *
SPEC. COND. (UMHOS/CM) FIELD	1368	1366		16296 *			19978	19850	
SPEC. COND. (UMHOS/CM) LAB		1350	200	14500			20200	22000	12200
PH FIELD				9.49			9.97 *	9.48	
PH LAB		7.63	10.4	9.25			9.6	9.73	9.69
TDS MEAS. @ 180 DEG. C		1114	206	14183 *	7298	18720	18523	18172 *	10984
OXYGEN (O) DISS		4.0		4.5			3.2	3.0	4.1
DEPTH TO SWL BELOW MP (FT)		7.74		8.83			7.85		7.02
COMMON IONS									
CALCIUM (CA)		126.5	17	371	437.0		361	426	345
MAGNESIUM (MG)		11	0.22	8.5	8.76		5.7	6.4	4.2
SODIUM (NA)		45	19	2900	2960.0		3890	3800	2200
POTASSIUM (K)		65	22	1950	158.00		2650	2550	1540
ALKALINITY AS CaCO3 (LAB)							587		
BICARBONATE (HCO3) (LAB)		72	11.0	486 *			11	11.0	11.0
CARBONATE AS CO3 (LAB)		11.0	36	11			284	163	197
HYDROXIDE (OH)							38	46	30
SULFATE (SO4)		480 *	16	9200	2480.0	2463.0	1200	11750	6750
CHLORIDE (CL)		3.0	16	57	63.0	75.0	66	74	35
TRACE ELEMENTS									
ARSENIC (AS) DISS	0.075 *	0.054 *	0.21	0.620	0.5130		0.353	0.590 *	0.553
ARSENIC (AS) +3				0.400				0.550	
ARSENIC (AS) +5				0.030				0.054	
CADMIUM (CD) DISS	0.021	0.021	0.003	0.030 *	0.0063		0.003	0.005	0.003
COFFER (CU) DISS	0.055	0.056	0.008	0.130	0.1190		0.128	0.085	0.043
IRON (FE) DISS	0.020	0.020	0.070	0.150	0.160		0.225 *	0.020	0.020
IRON (FE II)	0.02	0.01		0.010				0.070	0.01
LEAD (PB) DISS	0.023	0.026	0.083	0.098 *	0.1430		0.0505	0.021 *	0.094
MANGANESE (MN) DISS	1.590	1.540	0.017	0.155 *	0.129		0.083	0.090	0.050
ZINC (ZN) DISS	0.613	0.788 *	0.053	0.100 *	0.090		0.048	0.030	0.023

All quantities in milligrams per liter unless otherwise noted. Blank line indicates parameter not tested.

Output Date: 03-19-1989  
HWQ-6/86-R1

TABLE 1  
East Helena

SLAG SAMPLE LEACHATE ANALYSIS

1979

979

SARCO

ab No.

ab No.	Description	(PPM in Leachate)								
		As	Ba	Cd	Cr	Pb	Hg	Se	Ag	(Zn)
3278	Slag 1 (2-)	.018	.3	.08	<.01	.6	<.001	<.005	<.01	3.5
3279	Slag 2 (2-)	<.014	.1	.13	<.01	<.1	<.001	<.005	<.01	2.6
3280	Slag 3 (2-)	.020	.1	.03	<.01	3.4	<.001	<.005	<.01	2.1
3281	Slag 4 (2-)	<.014	.2	<.01	<.01	<.1	<.001	<.005	<.01	1.0
3282	Slag 5 (Pb)	.032	.2	<.01	<.01	3.3	<.001	<.005	<.01	5.0
3283	Slag 6 (Pb)	<.014	.1	.15	<.01	1.0	<.001	<.005	<.01	6.0

Maximum Contaminant  
levels for Non-  
toxic Leachates

(0.5)	10.0	0.1	0.5	0.5	.02	0.1	0.5	---	*
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NOTE



Currently unspecified but estimated to be 50 ppm (10 times the Drinking Water Standard).

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ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	As ppm	Cd ppm	Pb ppm
3658 Air Cooled	Blast Furnace Slag	5/ 7	.12	.002	5.3
3659 Granulated	Blast Furnace Slag	5/ 7	.047	<.002	.050

ASARCO Inc. Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Ag ppm	As ppm	Ba ppm	Cd ppm	Cr ppm
7860	TCLP-Fumed Blast Furnace Slag	10/21	<.002	.45	4.6	.007	.0
7861	TCLP-Unfumed Blast Furnace Slag	10/21	<.002	1.2	1.6	.25	.0

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Hg ppb	Pb ppm	Se ppm
7860	TCLP-Fumed Blast Furnace Slag	10/21	<.005	.28	.004
7861	TCLP-Unfumed Blast Furnace Slag	10/21	<.001	10.	.010

ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Ag ppm	As ppm	Ba ppm	Cd ppm	C ppm
6378	Air Cooled Slag	8/15	<.005	.012	<1.0	.002	<
6379	Granulated Slag	8/15	<.005	.010	<1.0	<.002	<

ASARCO LAB #	SAMPLE DESCRIPTION	1985 SAMPLE DATE	Hg ppb	Pb ppm	Se ppm	pH
6378	Air Cooled Slag	8/15	<.50	1.1	<.080	9.2
6379	Granulated Slag	8/15	<.50	.050	<.080	8.0

ASARCO Incorporated  
Department of Environmental Sciences  
EAST HELENA  
Miscellaneous Sample Results

ASARCO LAB #	SAMPLE DESCRIPTION	1983 SAMPLE DATE	Pb ppm	Cd ppm	Cr ppm	Ag ppm	Ba ppm
11370	2-4 mo. old Slag Composite	11/28	9.8	3.9	<.030	<.008	7.2
11371	1 week old Slag Composite	11/28	3.9	<.004	<.030	<.008	8.7

ASARCO LAB #	SAMPLE DESCRIPTION	1983 SAMPLE DATE	As ppm	Se ppm	Hg ppb	pH
11370	2-4 mo. old Slag Composite	11/28	.20	.012	<.50	10.
11371	1 week old Slag Composite	11/28	.35	<.004	<.50	10.

ppm							
<u>Ba</u>	<u>Pb</u>	<u>Cd</u>	<u>Cr</u>	<u>Ag</u>	<u>Se</u>	<u>Hg</u>	<u>As</u>
100.	5.0	1.0	5.0	5.0	1.0	.2	5.0

Maximum allowable levels of contaminants  
in the leachate of a non-toxic material.....

storage area. The sediments are being stored in a protected environment to prevent contamination of the adjacent area from dispersion of the sediments by wind and water. The sediments are located on a concrete pad to prevent contact with adjacent soils. A containment berm around the perimeter of the sediment pile diverts run-on. A geomembrane cover over the sediments prevents wind and water dispersion and eliminates subsequent generation of leachate.

Approximately 31,000 cubic yards of dewatered sediments were transported to the Lower Ore Storage Area. Four thousand cubic yards of these sediments were smelted prior to the stockpile being covered with a geomembrane liner in October 1997. The sediments will remain in this interim storage facility while EPA considers Asarco's request to modify the sediment smelting requirement of the ROD, and instead dispose of these materials in the on-site CAMU.

#### **4.1.4 Slag**

The effect of the slag pile on groundwater and surface water was evaluated as part of the 1990 Comprehensive RI/FS. The evaluation was conducted in accordance with procedures presented in the Comprehensive RI/FS Work Plan (Hydrometrics 1987). Based on the results of the evaluation, the RI/FS concluded that the potential for impacts to groundwater and surface water from slag is low and the subsequent ROD did not specify any remedial action for the Slag Pile Operable Unit. Post-RI/FS monitoring at adjacent surface water and groundwater monitoring sites is on-going. A summary of the slag investigation and the findings of the RI relative to slag are presented below.

##### **4.1.4.1 Investigation of Potential Groundwater Impacts**

##### **Slag Infiltration Test Basin Construction, Water Level Measurement, Water Quality Sampling and Analysis**

Infiltration and percolation of precipitation into the slag pile were directly measured in slag test basins constructed in fumed and unfumed slag. Fumed slag is a by-product of the zinc

recovery process, which consisted of air injection into molten slag to recover zinc oxide. Unfumed slag is a by-product of the blast furnace which has not been further processed through the zinc recovery process. The zinc recovery process was suspended in 1982 and zinc is no longer recovered from the slag. Since 1982, unfumed slag has been placed in an area segregated from fumed slag.

Two slag infiltration catchment basins were constructed; one in a typical location in the fumed slag, and one in a typical location in unfumed slag. Construction of the test basins included removal of a 2 to 3 meter layer of slag, placement of an impervious 36-mil reinforced Hypalon liner in the excavation, installation of a collection sump, and replacement of the slag. Figure 4-1-8 shows the slag test basin design.

Water elevations in the collection sumps were measured periodically, and after rainfall or snowmelt events to determine the actual accumulation of water in the slag basins. Collected water was pumped from the sump, sent to the TSC laboratory, and tested for the parameters listed in Table 3-2-2. Analytical results of water collected in the test basins are summarized in Appendix 4-1-2.

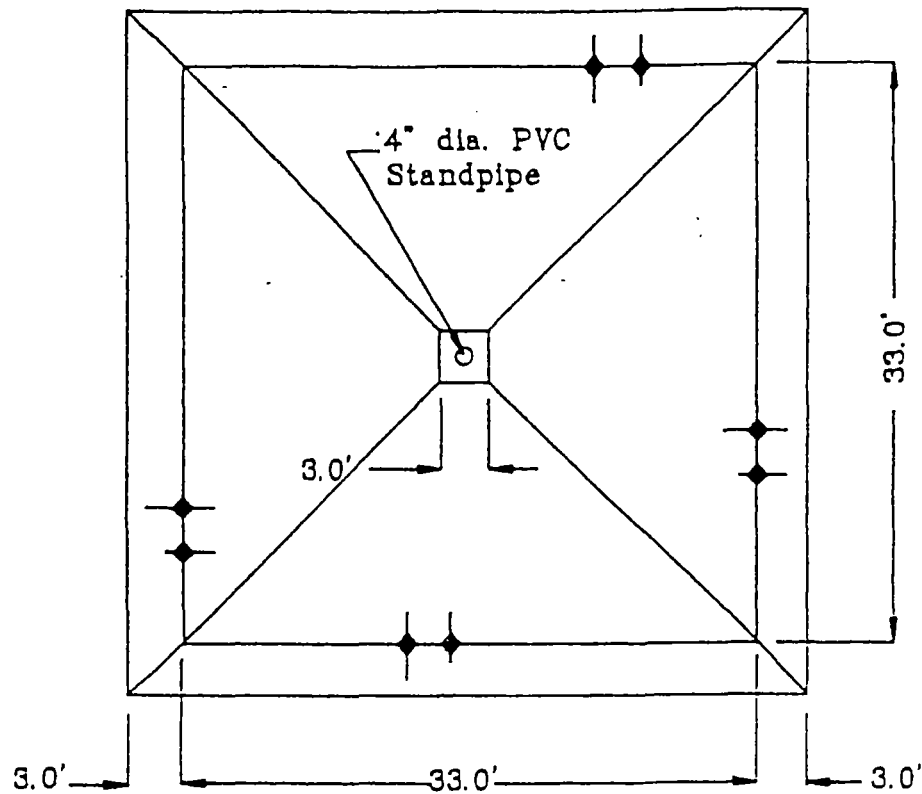
### **Slag Material Sampling and Analysis**

To supplement slag information collected from the test basins, samples of slag were collected from the test basin sites and sent to the TSC lab for "bottle roll" tests. Estimates of slag leachability were obtained by conducting "bottle roll" test on slag samples. Bottle roll tests involved placing samples of slag in bottles in the laboratory, adding deionized water, agitating the bottles for approximately 24 hours, then analyzing the water for concentrations of arsenic and metals. Details of the bottle roll extraction tests are in the Quality Assurance Project Plan (QAPP) Addendum to the Phase II Water Resources Investigation Work Plan (Hydrometries, 1986). Bottle roll test results are in Appendix 4-1-2.

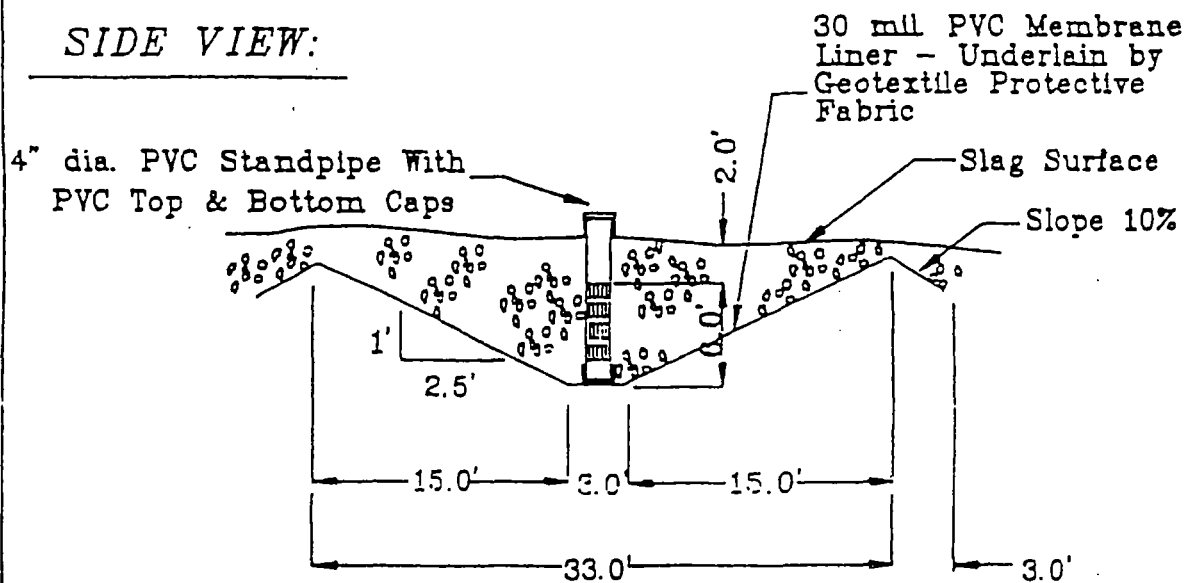


FIGURE 4-1-8 SLAG TEST BASIN DESIGN

PLAN VIEW:



SIDE VIEW:



NOTE: PVC Standpipe is schedule 40, capped on both ends and perforated with saw-cut slots from 2.0' to 8.0' beneath the slag surface.

In addition to the slag sampling and bottle roll test performed as part of the East Helena RI activities, additional slag samples were collected and analyzed using the EP toxicity procedure. Results of these analyses are also in Appendix 4-1-2.

### **Assessment of Groundwater Impacts**

In an effort to estimate infiltration rates, the volume of water retained in the slag test basins was calculated for 13 time intervals, beginning December 23, 1986 and ending February 10, 1988. These volumes were compared to the volumes of precipitation during the same periods and converted to percentages, as summarized in Table 4-1-10. The percentage of precipitation retained in the basins varied from -6.7% to 61.9% in the fumed slag, and -45% to 61.8% in the unfumed slag (negative percentages indicate evaporation rates exceed precipitation collected in the test basins). Although there is a relationship of test basin water level fluctuations to precipitation (see Figures 4-1-9 and 4-1-10), the relationship may be complicated by variable evaporation, hence, infiltration rates are variable.

Concentrations of arsenic and metals from test basin water samples (see Appendix 4-1-2) were low compared to plant area groundwater. Dissolved arsenic varied from 0.0198 mg/l to 0.075 mg/l in the fumed slag, and 0.353 to 0.590 mg/l in the unfumed slag during the study period. Dissolved cadmium varied from 0.003 to 0.075 mg/l in the fumed slag, and 0.003 to 0.0063 mg/l in the unfumed slag. Dissolved lead varied from 0.016 to 0.045 mg/l in the fumed slag, and 0.021 to 0.098 mg/l in the unfumed slag.

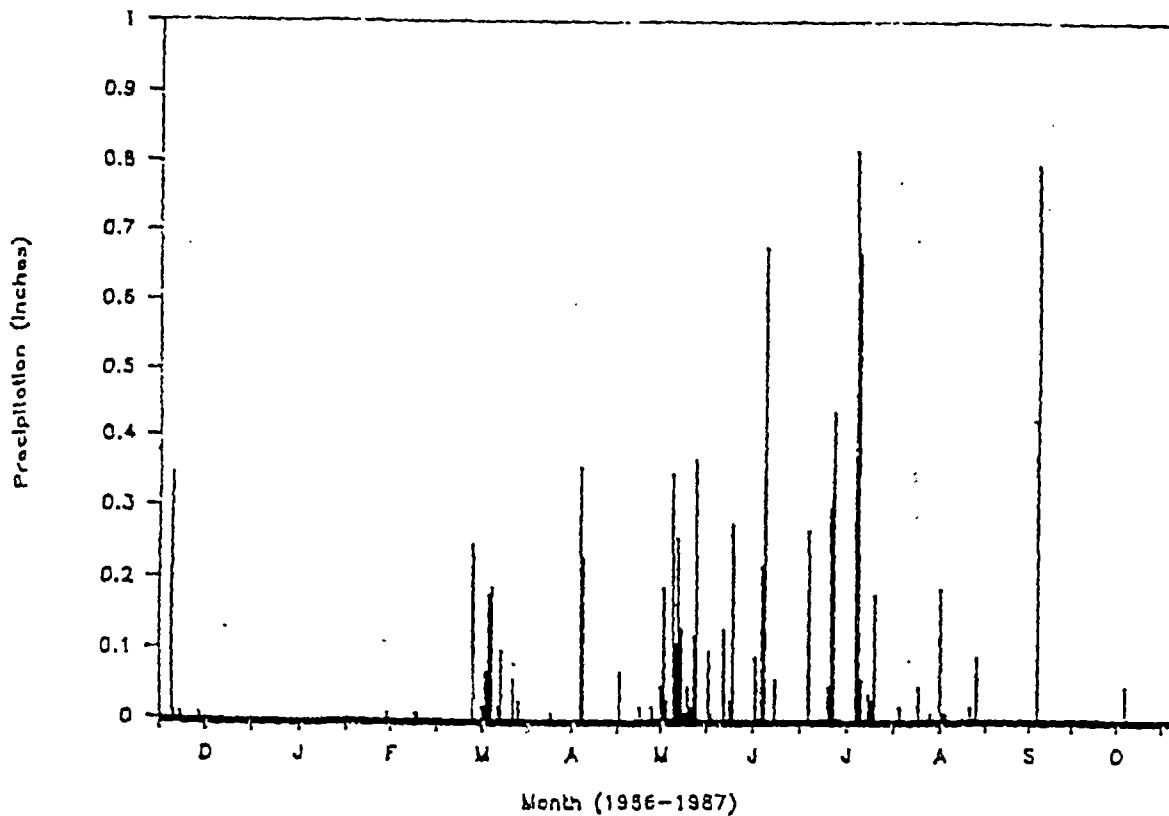
The concentrations of arsenic and metals from bottle roll testing (See Appendix 4-1-2) were similar to the slag test basin water quality. For the fumed slag, dissolved arsenic was 0.19 mg/l, cadmium was 0.003 mg/l, and lead was less than 0.017 mg/l. For the unfumed slag, dissolved arsenic was 0.31 mg/l, cadmium was 0.003 mg/l and lead was 0.083 mg/l.

EP toxicity tests (see Appendix 4-1-2) indicate that leachable trace element concentrations from the slag are variable. From 18 tests, the results for arsenic varied from below detection level to 1.2 ppm with an average of 0.16 ppm; cadmium varied from below detection level to

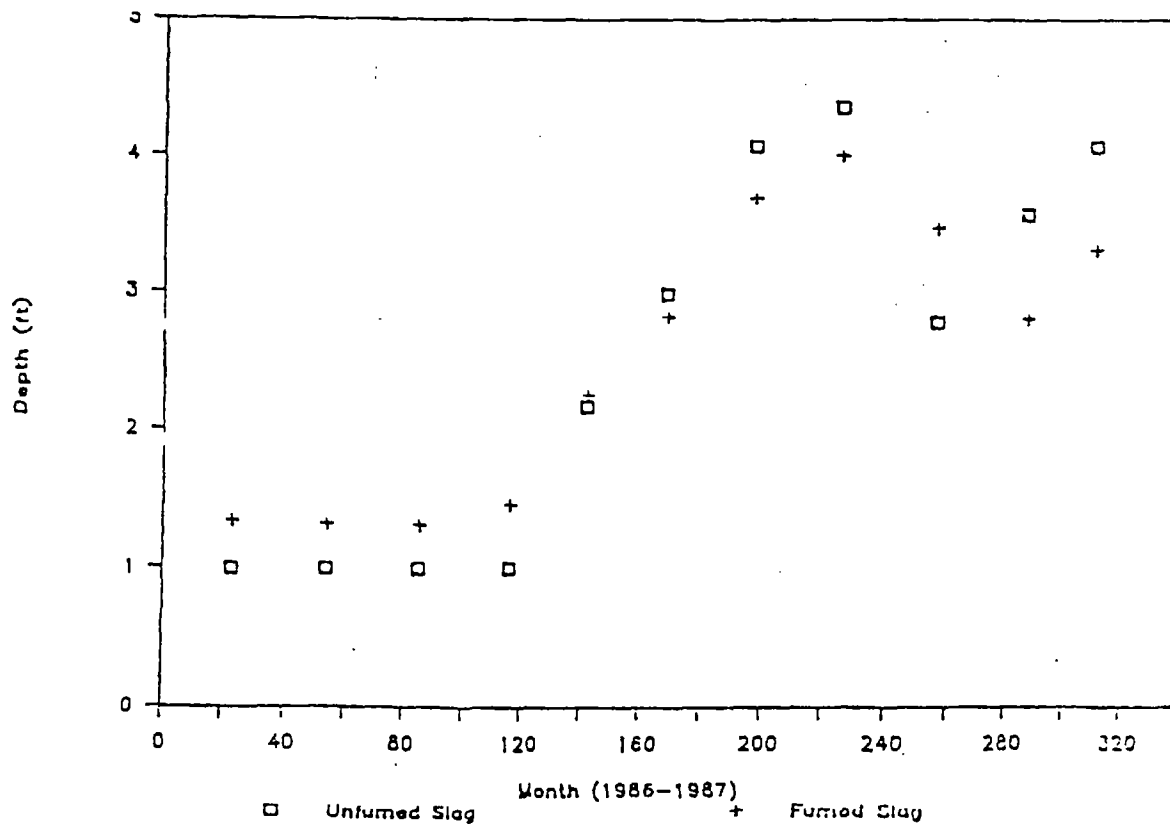
TABLE 4-1-10. PRECIPITATION COLLECTED IN SLAG TEST BASINS

FUMED SLAG			
Date	Precipitation (inches)	Precipitation Retained *	Percent of Precipitation Retained
12/23/86			
1/22/86	0		
2/23/87	0		
3/26/87	0.75	0.01	1.4
4/21/87	0.23	-0.01	-5.8
5/18/87	0.51	0.32	61.9
6/18/87	2.46	0.49	19.8
7/14/87	0.88	0.25	28.7
8/11/87	1.70	0.36	21.2
9/11/87	0.37	not calculated	
10/14/87	0.65	0.25	38.4
12/7/87	0.45	-0.02	-3.9
1/20/88	0.34	-0.02	-6.7
2/10/88	0.49	-0.01	-1.1
UNFUMED SLAG			
12/23/86			
1/22/87	0		
2/23/87	0		
3/26/87	0.75	0	
4/21/87	0.23	0.12	52.7
5/18/87	0.51	0.27	53.6
6/18/87	2.46	0.73	29.8
7/14/87	0.88	0.28	31.7
8/11/87	1.70	0.12	7.2
9/11/87	0.37	not calculated	
10/14/87	0.65	0.40	61.8
12/7/87	0.45	-0.05	-12.1
1/20/88	0.34	-0.15	-45.0
2/10/88	0.49	0.14	27.6

\* Value is calculated based on measured water level changes and test basin geometry (Frustum of a general pyramid). Negative values indicate evaporation exceeds infiltration.



CC/RA REPORT ASARCO EAST HELENA FACILITY	DAILY PRECIPITATION AT HELENA AIRPORT	FIGURE
		4-1-9



CC/RA REPORT  
ASARCO EAST HELENA  
FACILITY

DEPTH OF WATER IN  
SLAG TEST BASIN

FIGURE

4-1-10

3.9 ppm, with an average of 0.26 ppm (only one cadmium value was greater than 0.25 ppm; if the 3.9 ppm value is dropped, the cadmium average concentration is 0.04 ppm); lead values varied from below detection level to 30 ppm, with an average of 5.2 ppm.

The EP Toxicity tests were not conducted as part of the Comprehensive RI/FS activities, but have been included as supplementary data. The EP Toxicity results tend to overpredict the mobility of metals compared to the other test results and observed site conditions due to the low pH of the extractant. In particular, the values for lead appear to be much higher with TCLP than with natural conditions.

Concentrations of arsenic and other metals in the groundwater system are discussed in detail in Section 4.4. In general, results of water quality from the slag basins and bottle roll analyses of slag indicate arsenic concentrations are significantly lower than concentrations observed in monitoring wells both upgradient and downgradient of the slag pile. Figures 4-1-11, 4-1-12, 4-1-13 and 4-1-14 show a comparison to slag test basin water quality, bottle roll test water quality, EP Tox test results, and groundwater quality upgradient and down gradient of the slag pile.

Based on observed recharge rates in the slag test basins and associated water quality data, the slag pile would account for only 1 to 3 percent of the observed arsenic at downgradient monitoring well DH-10 (see Figure 4-1-15). Concentrations of arsenic in these wells are similar to arsenic concentrations in DH-4 near Lower Lake, the apparent source of elevated arsenic in these wells. Based on the results of test basin water quality analyses and bottle roll tests, it is unlikely that slag significantly effects observed arsenic concentration trends on the site.

While EP-Toxicity results indicate that there is some potential for mobility of cadmium, lead and zinc from slag, the results of the test basins and bottle roll tests indicate metals concentrations released from slag is low. In addition, concentrations of cadmium, lead and

FIGURE 4-1-12. CADMIUM CONCENTRATION DATA FROM GROUNDWATER MONITORING WELLS IN THE SLAG PILE AREA, AND FROM SLAG TEST BASIN AND SLAG LEACHABILITY TESTING RESULTS

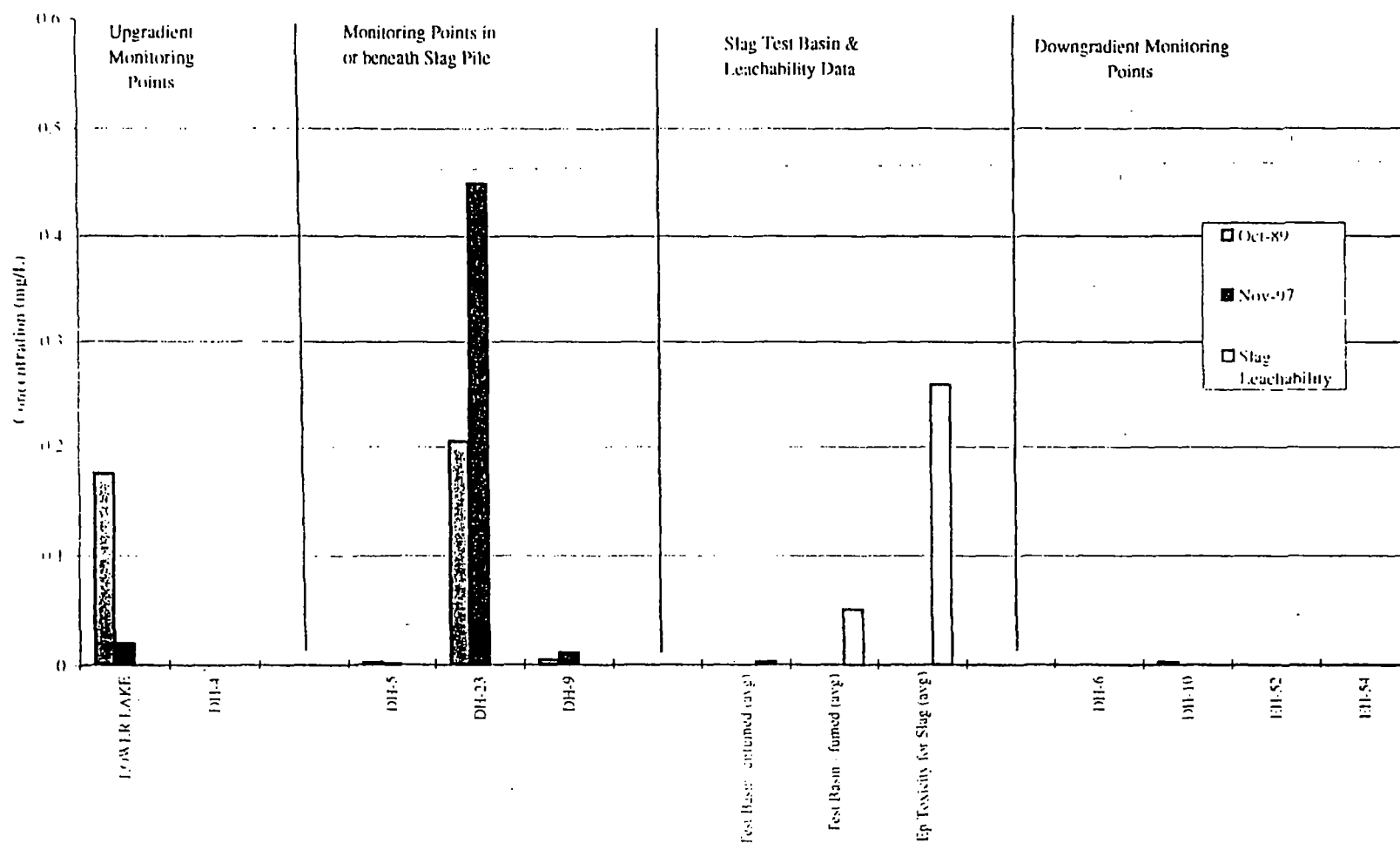


FIGURE 4-1-13. LEAD CONCENTRATION DATA FROM GROUNDWATER MONITORING WELLS IN THE SLAG PILE AREA, AND FROM SLAG TEST BASIN AND SLAG LEACHABILITY TESTING RESULTS

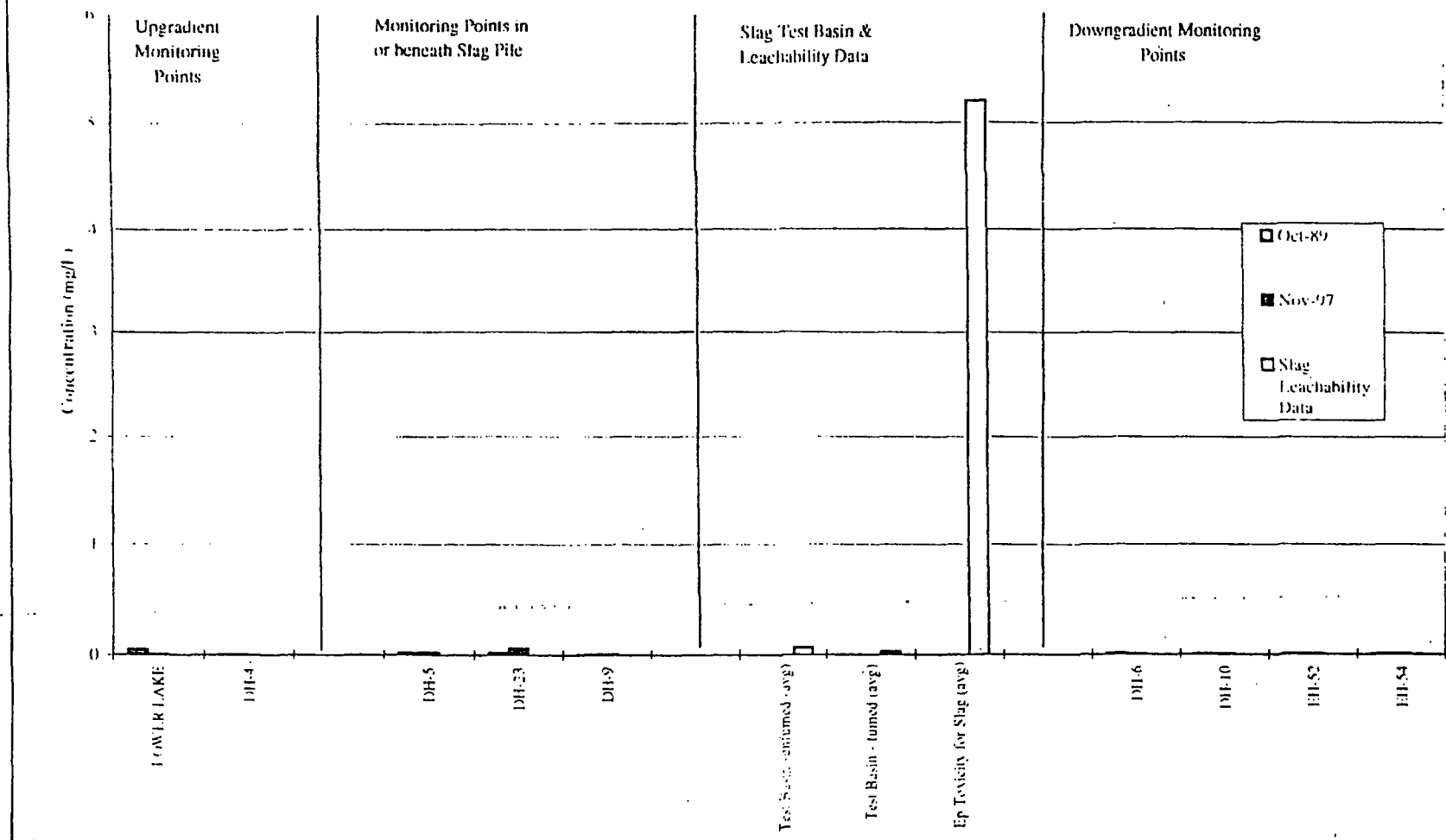
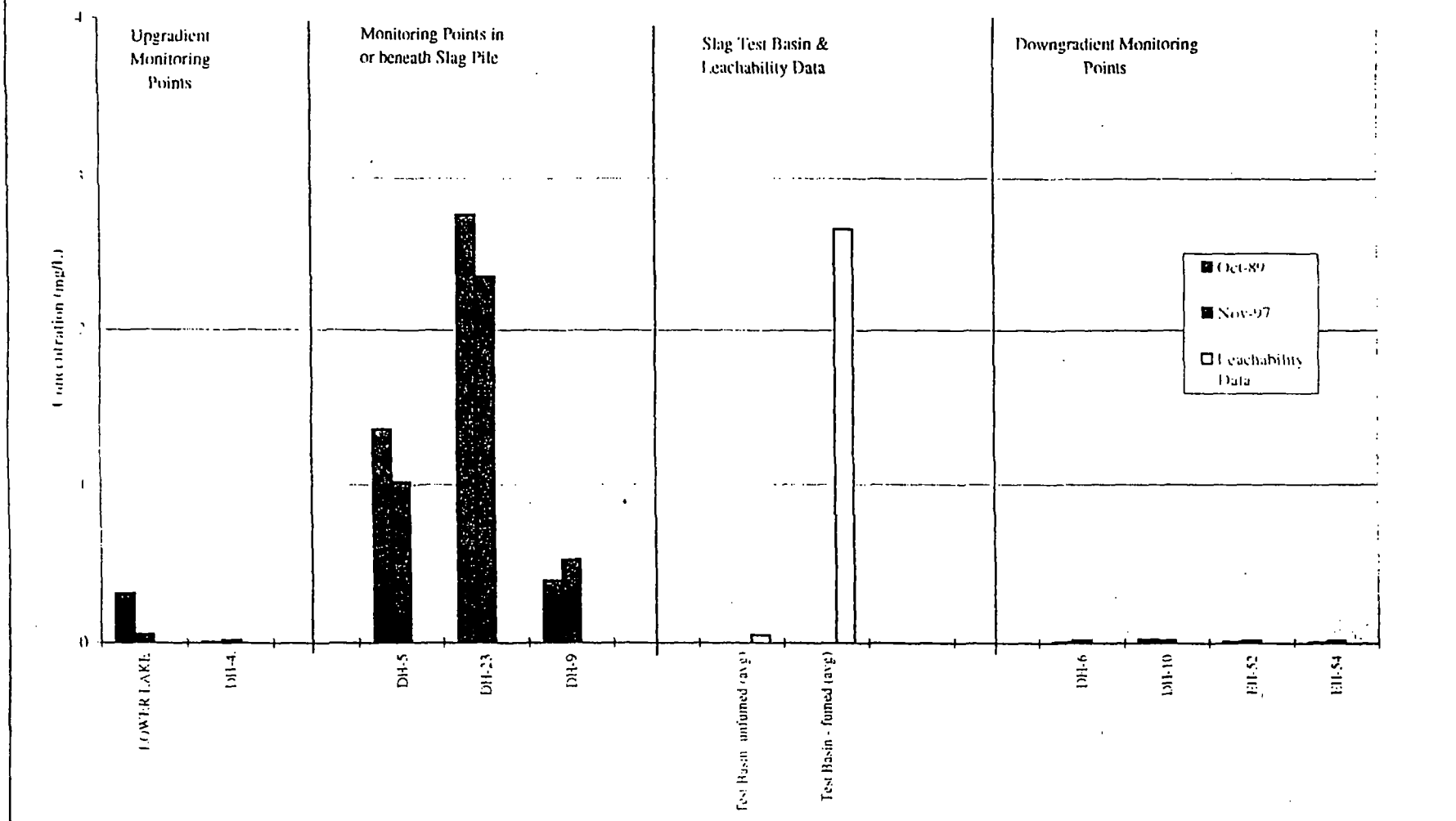




FIGURE 4-1-14. ZINC CONCENTRATION DATA FROM GROUNDWATER MONITORING WELLS IN THE SLAG PILE AREA, AND FROM SLAG TEST BASIN AND SLAG LEACHABILITY TESTING RESULTS



**FIGURE 4-1-15. CALCULATED ARSENIC LOADING FROM SLAG VS  
ARSENIC LOAD IN DOWN-GRADIENT GROUNDWATER**

Data Source	Arsenic Conc.(1)	Arsenic Load (2)	% of GW Load (3)
<b>Test Basin Data</b>			
Fumed Slag	0.036 mg/L	0.003 lb/day	0.20%
Unfumed Slag	0.53 mg/L	0.044 lb/day	2.40%
Average	0.28 mg/L	0.022 lb/day	1.30%
Max	0.59 mg/L	0.047 lb/day	2.60%
EP toxicity (avg. of 18 tests)	0.16 mg/L	0.013 lb/day	0.70%
Groundwater Load	2.13 mg/L (4)	1.8 lb/day (4)	

**Notes**

(1) Source RI/FS Appendix 6-1

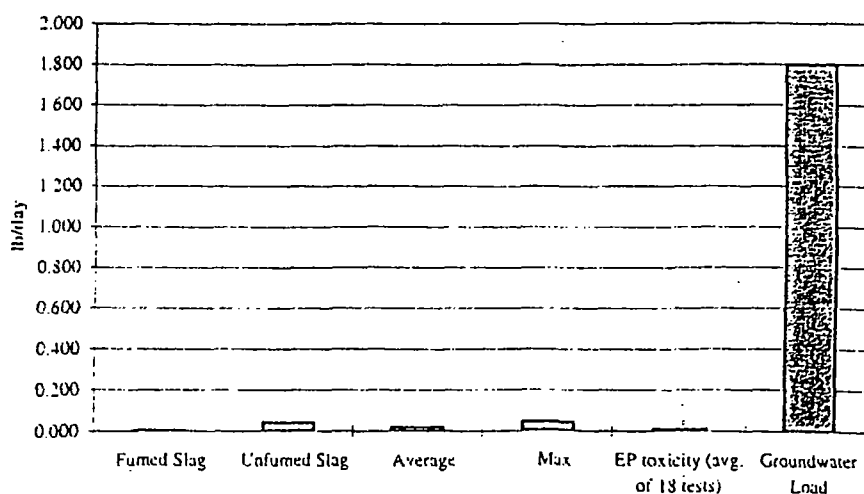
(2) Slag load calculations assume:  
20% infiltration (slag test basin average)  
11.3 in/yr ppt  
57 acre slag pile area

(3) Calculations based on 1.8 lb/day GW arsenic load assuming:  
east side groundwater flux of 70 gpm  
east side groundwater arsenic concentration of 2.13 mg/L

(4) Groundwater Load assumptions  
Groundwater As Concentration 2.13 mg/L (avg from DH-10)  
Groundwater flux = 70 gpm

(K:\DATA\PROJECT0867\WQ.XLS)

**Arsenic Load**



zinc is also very low. Based on the results of test basin water quality analyses, bottle roll tests, and down gradient groundwater quality, it is unlikely that slag effects observed groundwater quality trends on the site.

Stratigraphic cross-sections showing the slag pile and underlying stratigraphy (Figure 4-1-16) shows the relationship of the slag pile and underlying strata, including the perched alluvial horizon and the underlying coarser grained alluvial aquifer. Based on monitoring well stratigraphy, it is likely the perched horizon at least partially underlies the slag pile. However, there is no evidence of the perched horizon in downgradient wells (see DH-6 and DH-10). As a result, direct impacts from the slag pile at these wells is unlikely since the perched horizon is absent, and the wells are completed in the coarse grained alluvium. However, as noted above, test basin and laboratory test results indicate potential water quality impacts from the slag are low and are not responsible for the water quality concentration observed in downgradient wells.

#### **4.1.4.2 Potential Surface Water Impacts**

The potential for runoff transport in the slag pile area is very low due to the coarse, granular nature of the slag pile, which allows extremely rapid infiltration. Even during high precipitation events no runoff has been observed from the slag pile. Similarly seeps from the face of the slag pile have not been observed. The potential for impacts to surface water are, therefore, limited to direct contact and erosion of the slag pile where it forms steep sided banks adjacent to Prickly Pear Creek. Prickly Pear Creek is in immediate contact with the slag pile between PPC-5 and PPC-6, and adjacent to the slag pile from PPC-6 to PPC-7 (see Exhibit 3-2-1).

The 1990 Comprehensive RI/FS (Hydrometrics, 1990a) examined water quality data from Prickly Pear Creek to assess the potential impact of the slag pile on the creek. No consistent concentration or load increases were apparent in Prickly Pear Creek adjacent to the slag pile (between PPC-5 and PPC-7). The RI/FS therefore concluded that the contribution of arsenic and metals to surface water from slag is very minor. RI/FS and Post RI/FS water quality data

for Prickly Pear Creek are presented and discussed in Section 4.3 of this report and post-RI/FS water quality data are generally consistent with the RI/FS findings. Average metal concentrations show only small differences between stations PPC 5, PPC 7 and PPC 8 (see Figure 4-1-17). Only one high flow stream event (May 1994) shows a pronounced increase in total arsenic load between PPC-5 and PPC-7 (see Figure 4-3-9 in Section 4.3); however, arsenic concentrations decreased from PPC-5 to PPC-7 in the May 1994 event. The calculated load increase is therefore entirely a function of the flow measurement. Since the accuracy of the flow measurements is poor during higher flow events due to increased velocities and turbulence (particularly at PPC-5 below the dam) the apparent load increase during May 1994 is probably the result of flow measurement error. The conclusion of the surface water analysis is that there is little evidence for transport of arsenic and metals from the slag pile with the possible exception being direct erosion of the slag during infrequent high stream flow events.

#### 4.2.4.2 PROCESS FLUIDS

As part of the Comprehensive RI/FS (Hydrometrics 1990a), the Process Fluids Operable Unit was divided into two sub-units: Process Ponds and Process Fluid Transport Circuits.

##### 4.2.4.2.1 Process Ponds

The Process Ponds include:

- Lower Lake,
- Former Thornock Lake, and
- The acid plant water treatment facility.

As described in Sections 1 and 3, the Process Ponds were addressed by the Process Ponds RI/FS (Hydrometrics, 1989), a subsequent Process Ponds ROD (US EPA, 1989), and several RD/RA documents, and remedial actions that consisted primarily of sediment excavation. The 1989 Process Pond RI consisted of:

## ASARCO TECHNICAL SERVICES CENTER

## ANALYTICAL DATA REPORT

East Helena

Technical Services (Project 3101)

Batch No: L010790

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
--------	----------------	-------------	-----------	-------	-------	---------	---------------	-----------	--------

L010790-002 23-MAY-01 FUMED ASARCO SIAG

AG	0.001	%	MJF	19-JUN-01	ICP
AL	2.32	%	MJF	18-JUN-01	ICP
AS	0.022	%	MJF	19-JUN-01	ICP
BA	0.34	%	MJF	18-JUN-01	ICP
BE	<0.02	%	MJF	18-JUN-01	ICP
CR	0.036	%	MJF	18-JUN-01	ICP
CU	0.32	%	MJF	18-JUN-01	ICP
HC	2.7	ppm	MO	21-JUN-01	COLD VAPOR AA
MN	1.37	%	MJF	18-JUN-01	ICP
NI	<0.02	%	MJF	18-JUN-01	ICP
PB	0.036	%	MJF	18-JUN-01	ICP
SB	0.026	%	MJF	18-JUN-01	ICP
SE	<0.02	%	MJF	18-JUN-01	ICP
TL	<0.02	%	MJF	18-JUN-01	ICP
V	<0.02	%	MJF	18-JUN-01	ICP
Zn	1.63	%	MJF	18-JUN-01	ICP

## ASARCO TECHNICAL SERVICES CENTER

## ANALYTICAL DATA REPORT

East Helena

Technical Services (Project 3101)

Batch No: L010791

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L010791-002	23-MAY-01	FUMED ASARCO SLAG (TCLP)	AG	<0.050	ppm	ESH	08-JUN-01	6010	
			AS	<0.10	ppm	ESH	08-JUN-01	6010	
			BA	1.4	ppm	ESH	08-JUN-01	6010	
			BE	<0.005	ppm	ESH	08-JUN-01	6010	
			CD	<0.050	ppm	ESH	08-JUN-01	6010	
			CR	<0.10	ppm	ESH	08-JUN-01	6010	
			HG	<0.50	ppb	MO	07-JUN-01	7470	
			NI	<0.10	ppm	ESH	08-JUN-01	6010	
			PB	0.23	ppm	ESH	08-JUN-01	6010	
			PH	9.2	pH	MO	05-JUN-01	150.1	
			SE	<0.10	ppm	ESH	08-JUN-01	6010	
			TL	<0.10	ppm	ESH	08-JUN-01	6010	
			V	<0.10	ppm	ESH	08-JUN-01	6010	
			ZN	17	ppm	ESH	08-JUN-01	6010	

*Vince Kelt*  
Approved  
*Vince Kelt*  
Reviewer

## **APPENDIX E**

### **TEMPORARY CAP SPECIFICATIONS AND DETAILS**

# **INSTALLATION SPECIFICATION —RPE® GEOMEMBRANE**

## **PART 1 – GENERAL**

### **1.1 SCOPE**

- A. The work covered by this specification consists of the supply (and installation) of an RPE geomembrane at the locations shown on the drawings (as directed by the Owner).
- B. The supply (and installation) of this liner shall be in accordance with the following references:
  - 1. ASTM D751-89, Standard Test Methods for Coated Fabrics.
  - 2. ASTM D3020-89, Standard Specification for Polyethylene and Ethylene Copolymer Plastic Sheeting for Pond, Canal, and Reservoir Lining.
  - 3. ASTM D4545-86(91), Standard Practice for Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet Geomembranes.

## **PART 2 – PRODUCTS**

### **2.1 MATERIAL CHARACTERISTICS**

- A. The sheeting shall be suitably formulated from first quality polyethylene materials. The geomembrane shall consist of a high strength, oriented-tape HDPE scrim coated on both sides with an impervious LDPE coating (HDPE coating for OR RPE 25). RPE materials prepared for temporary covers or other exposed application will have UV stabilizers added to the impervious coating (and may have UV stabilizers added to the scrim tapes). The RPE material shall be pigmented to produce a uniform color such as black, blue, or silver. Unpigmented materials may be used for applications that are backfilled.
- B. The sheeting shall be capable of being sealed to itself using a stitched “Z” fold or heat-sealing techniques.
- C. The sheeting shall be supplied in the widest widths possible to minimize fabrication seaming. Roll widths shall be not less than 3.5 m.

### **2.2 MANUFACTURER’S STATEMENT**

- A. Upon request, the manufacturer of the RPE sheeting shall submit a certification that the material meets the manufacturer’s specifications. Material index quality control tests shall be performed a minimum of every 18,000 kg (40,000 lbs), once per shift, or at the start of a new material run.

### **2.3 MATERIAL PROPERTIES**

- A. The geomembrane shall be OR RPE 25 as supplied by Layfield Plastics or an approved equal. The geomembrane shall conform to the manufacturer’s material properties table. All values are Typical Values unless otherwise noted.

### **2.4 WARRANTY**

- A. Contractor shall provide Owner with a warranty guaranteeing a minimum of three year satisfactory liner performance from defects and UV-degradation.



## **PART 3 – EXECUTION**

### **3.1 FABRICATION**

- A. On all projects larger than 20,000 m<sup>2</sup> (200,000 ft<sup>2</sup>), submit a panel layout in accordance with the project submittal requirements. On the panel layout, indicate the proposed arrangement of panels, fabricated seam orientation, field seam location, and anchor trench locations.
- B. Individual roll widths of RPE shall be fabricated into large panels to minimize field seaming. All fabrication welds shall be a minimum of 25 mm (1 inch) wide. Heat welding techniques shall be used for shop fabrication such that all shop welds will provide a delamination of the coating from the scrim when tested. Peel testing will meet the requirements for a "Film Tear Bond" (FTB) Peel Adhesion. The minimum FTB rating shall be AD-DEL.
- C. Fabrication welding shall be tested for Bonded Seam strength at a rate of three samples for every 915 lineal meters (3,000 ft) of welded seam. At the fabricator's option, one sample may be taken from each 300 lineal meters (1,000 ft) of welded seam or every 5 shop seams (whichever is greater). Seam samples will be tested for shear strength. Fabricated seam strengths shall conform to the shop seam strength values. Seams samples shall also be qualitatively tested for peel adhesion with a Film Tear Bond rating being obtained on all seams. Seams that do not meet the strength or FTB criteria are to be repaired and retested.
- D. Fabricated panels shall be accordion folded in one direction and neatly rolled in the other. Each panel shall be protected with an opaque, weather resistant covering and marked with panel dimensions and unfolding directions. All panels shall be delivered and stored in a protected area until ready for installation.

### **3.2 INSTALLATION**

- A. Prepared surfaces shall be smooth and free of sharp objects, rocks, and organics (roots). If a suitable subgrade is not available then 100 mm (4 inches) of clean sand, and a 10 ounce geotextile shall be placed prior to liner installation (subject to site conditions). A 10 ounce geotextile shall be placed under the liner in all areas.
- B. Installation shall be performed in a logical sequence by an installer/contractor experienced in lining installations.
- C. Place panels according to the drawings and the panel layout. Sufficient thermal slack shall be incorporated during placement to ensure that harmful stresses do not occur in service. Distribute slack wrinkles evenly.
- D. All field seams shall be tightly bonded using tape seaming technology. Six inch wide polyisobutylene-butyl sealant tape shall be used at penetrations and for all field seams.
- E. Full contact between the tape and the material will be the standard of acceptance.
- F. All field seams shall be non-destructively tested along their entire length using the Air Lance Test (ASTM D4545) or the Mechanical Point Stress Test (ASTM D4545). Patches and seams around pipe penetrations and fitments shall be tested using the Point Stress Test (ASTM D4545). All discontinuities detected by any test method shall be repaired.
- G. Repairs shall utilize the same material as the geomembrane, or a material compatible with the geomembrane, and shall extend a minimum of 300 mm (12 inches) beyond the defect. Repairs shall be accomplished with tape seaming techniques utilizing a tape appropriate to existing site conditions. All repairs are to be tested using Air Lance or Mechanical Point Stress methods as applicable (ASTM D4545).

- H. Protect the geomembrane from wind uplift during installation through the use of sand bags or other suitable weights. Backfill anchor trenches and place design backfill on geomembrane as soon as practical. Placement of backfill should be monitored continuously, and any damaged areas repaired and tested.
- I. Shingle RPE seams in the direction of water flow as applicable. If possible, backfill in the direction of flow to prevent application of stresses to field seams.
- J. Pipe Boots. Fit and seal pipes, well casings, manholes, and other penetrations of the geomembrane with shop fabricated boots as shown on the Drawings. Match the flange portion of the boot to the angle of the slope or bottom where the pipe or manhole enters the liner for a smooth fit without excess stretching of the material.

**END OF SECTION**

## CLARIFICATIONS FOR TEMPORARY CAP DESIGN

### Clarification #1 - RPE® Geomembrane

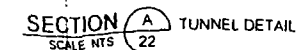
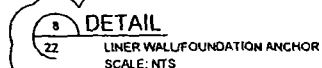
The clarification for the conflict between Note 4 on Hydrometrics Sheet 16 and the Installation Specification —RPE® Geomembrane of this Appendix C regarding the seaming requirements is that seams shall be sewn. Note 4 on Sheet 16 states that the seams must be sewn. The Installation Specification – RPE Geomembrane states that the seams can be either sewn or taped. This clarification states that for the construction of the Temporary Cap at the former Speiss-Dross Plant area, the RPE geomembrane seams shall be sewn and taping will not be allowed.

### Clarification #2 – Clean Sand Substitute

Slag may be substituted for clean sand for subgrade preparation as specific in the Installation Specification —RPE® Geomembrane, Paragraph 3.2 (A).

### Clarification #3 – Final Grade Flow Pattern

The importance of the final grade flow pattern will be discussed in further detail at the pre-bid conference.

[illegible]

UPDATE TIME 3:00PM  
J50 VMS\027807\Land Projects\605202\04C\605202H022.dwg

## **APPENDIX F**

### **EXAMPLE INSPECTION FORM**

## INTERIM CAP INSPECTION CHECKLIST

AREA INSPECTED	Area No.		Inspected by:	DATE:		
	ITEM NO.	CONDITION	OBSERVATION	ACTION NEEDED		
				MONITOR	INVESTIGATE	REPAIR
INTERIM LINER SYSTEMS	1	Exposed liner				
	2	Sand Bags				
	3	Liner Seams				
	4	Liner/Concrete Attachments				
	5	Site Drainage				
Additional Comments:						